COAL AGE

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It's the Will to Win That Counts

An easy way to pull men out of ruts is to get them to set their hearts upon accomplishing a certain task. We have seen it tried over and over again and always with success.

Not until the following payday did they realize that their earning power had been increased.

BY WAY OF ILLUSTRATION: An assistant was put in charge of an operation temporarily because his superintendent was sent off to make an extended inspection of another property for his company. The assistant decided that the time was opportune for calling his directors' attention to his abilities, and to that end determined not only to keep things going as well as they had been going, but to do even better.

In an effort to get his bearings, he tabulated the tonnage records of the companies' mines for several years back, and in so doing, discovered that a slight increase in the outputs for the remaining six weeks of the year would give his division the largest output that any of the companies' mines had ever reached. Not only that, but they would have a fighting chance of breaking the best record ever made in the state. Naturally, he became very much excited, and when he began to discuss the matter with his men, showing them the possibilities, they also became very much excited, so much so, in fact, that he decided that it would be useless to tell them that he hoped every one would do his best; he saw that their imaginations had been fired and realized that further urging was unnecessary.

Within a few days the entire camp was fairly alive with excitement, and things began to hum as they had never hummed before. Almost every employee came by the tipple each evening to see what the day's output had been, and if it fell short of the daily average by so much as a ton, every one went home with a long face, and it is even recorded that on such occasions, some lost their appetites for supper, and made things generally unpleasant about their homes. Even the driver boys and tipple hands entered into the spirit of the thing, and had little contests of their own. If the excitement had continued indefinitely, most of the mules would have been fit subjects for the humane-society officers.

Of course, a new tonnage record was established—nothing could have prevented that—but what is more to the point, most of the men discovered that they were capable of accomplishing much more than they had thought possible, and that without undue effort: truth is, their increased earnings came almost as a surprise, so absorbed had they become in the struggle for a record, and not until the following payday did they realize that their earning power had been increased.

Ideas and Suggestions

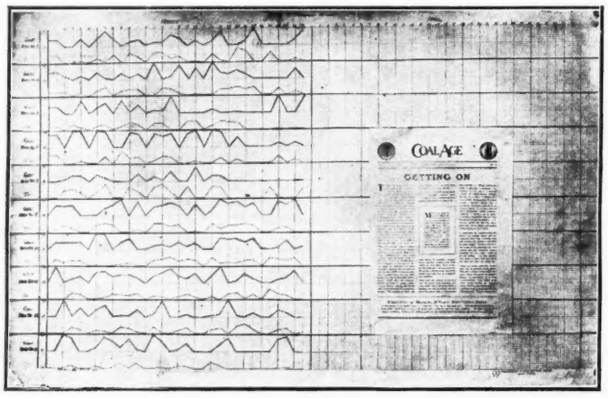
Encouraging Men to Study

By Thomas Quinn*

Needless to say, all coal-mining men of any importance read *Coal Age* and, in fact, must do so in order to keep abreast of the times in the coal mining industry.

The accompanying print illustrates the method P. J. Harrigan, general superintendent of the O'Gara Coal Co., uses to encourage the reading of *Coal Age* and furthermore to express his sentiments to subordinates.

The photograph shows the "Foreword" of a recent edition of *Coal Age* in a frame with the labor and material cost chart, which is set in a conspicuous place for the use



DAILY RECORD OF MINING COST AND TONNAGE

of superintendents and mine managers and incidentally for the entire office force.

"Don'ts for Bosses Big and Little," which appeared in the issue of Mar. 25, 1916, has been framed and occupies a prominent position in the general superintendent's private office. Mr. Harrigan's practice of encouraging useful reading is to be commended, and his method is well worth copying.

Is Your Mine Doctor a Fake or a Physician?

Mr. Mine Owner, do you know whether your "company doctor" is the kind of man you'd be willing to trust with the lives of your wife and baby? Your doctor, is he one who would turn the newly born babes of the camp, your future miners, over to the old-time nurses, who, with their "teas and toddies," in the very beginning of the baby's life impair the child's digestion, which naturally, being overlooked, will grow worse?

Does your doctor neglect the school children, allowing adenoids, enlarged tonsils and impaired eyesight to go unnoticed? Is he so careless about infectious diseases that he carries them from one patient to another, or is he incapable through ignorance of diagnosing the malady as communicable, and as a result does he send patients thus afflicted away to some city hospital where they are refused because they cannot be allowed to spread their disease to others? You know the fate of these people. They are brought back to the mining town all the worse for the journey.

Does your doctor fail to give immediate attention to persons who are hurt in the mines, thereby allowing blood poison and resultant loss of life? Does he keep such a limited supply of drugs that you must needs send to other camps or to the city for your necessary medicine, and has he so few implements that he is unable to perform operations that are not difficult, yet might save lives?

Does he refuse to call in other assistance when the case is beyond him or very mournfully declare, "I did the best I could?" Does he lock up his books and leave medical associations alone, saying "What's the use; I don't have any competition?"

Does he treat his mining-camp babies as he would those in a hospital—in fact, make a study of the little ones and their ailments, as if he realized that a sound body in the prime of life depends largely on the groundwork laid in the early days? Does he keep a supply of proper artificial foods in case they are needed?

Does he lecture to his school children, examining them often and seeing that the defects so common to them are remedied? Also, through the coöperation of the dentist, does he have their teeth cleaned gratis? Does he take pains to see that the school building has modern equipments—a proper ventilating system, sanitary drinking fountains and a proper system of lighting?

Are your men given immediate and careful attention when an accident occurs? Does the doctor persuade you or your superintendent to send "tanglefoot" to each house in camp during the summer, and does he attend the operators' association along with you, see the moving pictures of both flies and mosquitoes, hear the lectures, then secure pictures for his own motion-picture machine at home so that the people in his and your camp may see for themselves?

Does he keep your camp in such a condition that there will be no case of infectious disease in a whole year's time? Is he so highly esteemed that he will be elected president of his county medical association and then succeed himself? Does he attend the medical associations even to the national and on his return put into practice the knowledge thus gained?

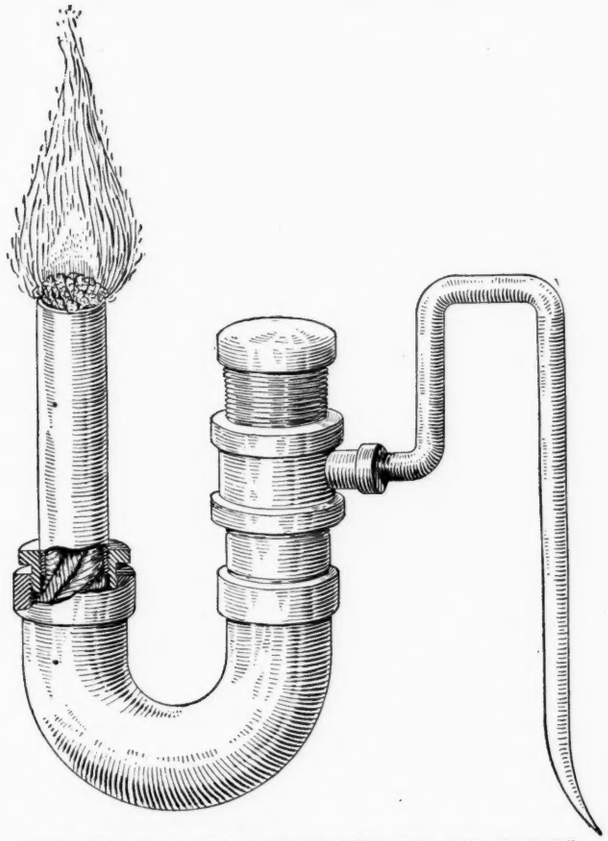
Does he have his commissary fill a certain section with proper drugs, and is his own office well supplied with implements? It is easy to know the fake from the physician. You'll find the difference, too, if you'll try. Again I would ask, is your physician the kind with whom you'd trust the life of your wife or baby? No? Well, have you ever stopped to think that a miner loves his wife and baby every bit as much as you do your own?

*Chief engineer, O'Gara Coal Co., Harrisburg, Ill.

A Home-Made Rear-End Torch

By C. J. Fuetter*

Whether or not the mining laws of the state require the mine foreman to provide a conspicuous light on the front and rear end of every trip or train of cars when in motion in a mine it should be done, if only for the sake of safety. It is usual to employ an oil torch for the rear light. As a rule the ones purchased for that purpose are almost too light for the rough handling they receive, and consequently the replacements are frequent.



THIS TORCH CANNOT BE BLOWN OUT AND CAN BE MADE AT THE MINE

I have found that the home-made torch shown in the accompanying illustration, although the first cost may be a little high, has proved in the long run to be less expensive and more satisfactory. The following pipe and fittings are needed to build this torch:

1—1-in. nipple 5 in. long.
1—1½x1-in. bushing.
1—1½-in. open-pattern return bend.
1—1½-in. nipple 4 in. long.
1—1½x1½x⅜-in. reducing tee.
1—1½-in. pipe cap.
1 hanger hook.

The hook shown in the illustration, by means of which the torch is suspended from the car, was made from ¾-in. round iron threaded to fit the reducing tee. This hook should be about 1 in. longer than the torch. The wick should be be about 11 or 12 in. long. Oil is introduced by unscrewing the pipe cap on the top of the reservoir. A torch built in this manner is almost indestructible and will stay lighted even in a strong air current.

*Van Lear, Ky.

Improving Living Conditions

By Forney L. Parker*

A miner spends his time in three ways—at his work, in his home and at his hobby—and because of his environment and other conditions, his home is usually his hobby, so it should be a congenial place in every way. Making the home congenial does not mean that the company employing the miner must build a pretentious house for him, but it means that the man himself must take enough interest in his home to express his individuality in it. So many men and their families living in company houses have the mistaken notion that because they do not own their homes they should not do anything to improve the appearance and comfortableness of the places.

It may be that conditions do not warrant a large expenditure of money on the part of the corporation in the construction of their dwellings, and if this be the case there are many things which the miner himself can do to make his home a lovely place to live in.

If the men are neat and careful about their homes, they will be likewise at their work, and the company should appreciate this attitude and do everything possible to encourage it.

The quality of the houses should be graded according to the position of the employee. For instance, there should be better homes for the firebosses than for the miners, and a still more pretentious residence for the foreman. This will be an added incentive for the employee to improve his position.

Though the expense of good sewerage may be high, the employee should be willing to pay his share of it when he considers that the welfare of his family depends upon careful sanitation.

A Cloth Backing for Maps

By A. I. Levorsen†

After considerable experimenting, the following was found to be a satisfactory and easy method of putting cloth on the backs of paper maps, drawings, etc., in order to strengthen them for field or office use.

The cloth is soaked in water and stretched as tightly as possible over a smooth board or table top, using thumbtacks or carpet tacks to hold it in position. The map or drawing to be mounted is also soaked, and a coat of paste is applied to the back of it as well as to the stretched cloth, rubbing the paste well into the meshes of the cloth. Pressure is then applied by means of a roller, to obtain a close contact between the cloth and the paper and to get rid of any excess paste. It is allowed to stand thus until dry. The paste used is of the common wall-paper sort, which, if it should happen to get on the surface of the map, can be easily rubbed off without any harm being done. Care must be taken in soaking the print that the ink used does not run or smear, and also in applying the pressure, that the surface does not rub off. Unbleached muslin makes a strong backing cloth, and since it is of close weave, it will support the map if further work is to be done on it.—*Engineering and Mining Journal.*

*Joliett, Penn.
†Fergus Falls, Minn.

The Wire Rope and the Coal Mine

By James Steelman*

SYNOPSIS—Wire rope is used extensively about coal mines. It is employed for many purposes such as hoisting, haulage, guying, and for aërial tramways. Different uses require correspondingly different types of rope. An excellent guy rope would be entirely unsuited for hoisting or haulage, as would also be the locked-coil cable, which is admirably adapted to aërial tramways.

The standard wire rope for vertical lifts is that which has 6 strands of 19 wires each. This rope is obtainable in 6 or more materials, from iron to an improved plow steel. The strands are circular in section and wound upon a hemp core. The individual wires are rather small. It may be readily used on sheaves and drums of moderate size, but is subject to rather rapid wear because of the smallness of the wires. The rated strength of such rope varies with the material, running for 1-in. rope from, say, 29,000 to 90,000 lb. The cost varies from about 26 to 50c. per linear foot. This type of rope is used because it combines flexibility and strength.

Vertical lifts in American coal mines are not as a rule deep; those over 1,700 to 1,800 ft. are either few or do not exist. Two uses for hoists exist at coal mines: First, there is the lift which handles men and materials; then there is the hoist which raises great tanks of water in the process of draining the mine.

In either case the weight of the rope is a large part of the load. A 1-in. 6x19 rope weighs about 1.58 lb. per linear foot, so that 1,700 ft. hanging down a shaft would stress the top region of the rope 2,600 lb. As the working strength is obtained by dividing the rated strength by 5, 6 or 7 or even a larger number and then deducting for the bending stress, it will be readily understood that the weight of the rope really enters the problem in a substantial way.

One of the most severe stresses that a vertical hoisting rope has to endure is applied at the moment of starting a load up from the bottom. This stress results from both the weight and the inertia of the load. An effort to relieve the severity of this starting stress is to be seen in the use of the conical drum. The load is started with the lifting rope on the small end of the cone and consequently with a lesser rope speed. However, the conical drum does not seem to have found favor to any overwhelming extent. In fact, it would appear that conical drums are used with greater frequency in connection with shorter lifts. The slower start and less stress from the load are offset more or less by the very fact of the existence of a bend in the rope of a radius of curvature of less than the average of the drum. The straight drum is in quite general use. With it the only modifications of speed must be accomplished in connection with the drive of the hoist.

Where a single drum of either type is used on a double hoist, the total winding surface is divided between the two ropes. One rope winds onto the drum at the top, while the other winds off at the bottom. The ropes, in a typical installation, pass from the drum up to and over two head sheaves placed in a wooden or steel tower at the head of the shaft. It is good practice to attach the ropes to opposite sides of the drum and to have enough rope to permit several convolutions to be still on the drum when either is paid out to the limit of the vertical movement.

*New York.

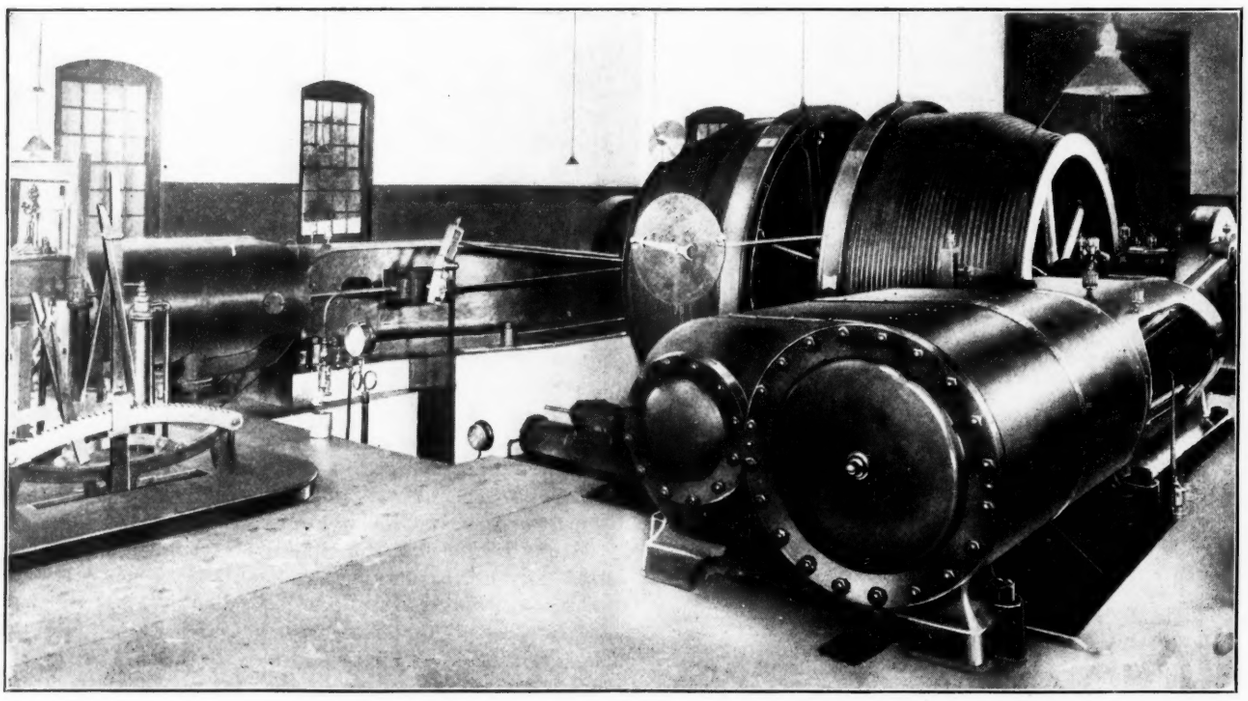


FIG. 1. A LARGE HOISTING ENGINE WITH CONICAL DRUMS

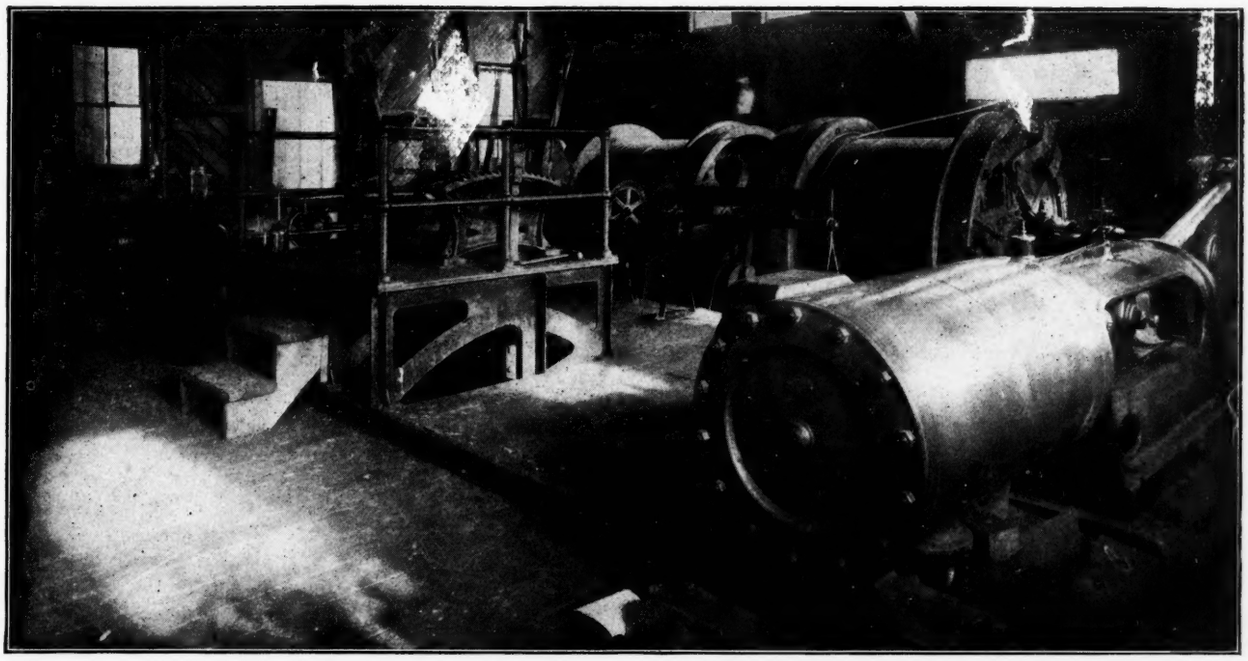


FIG. 2. A MINE HOIST WITH CYLINDRICAL DRUMS

Since the drum end of either rope, at the point where it comes to or goes away from the drum, shifts from side to side, it is not possible to locate the hoisting drum so as to have the rope continually in perfect alignment with the groove in the sheave. It will now be crowding one side of the groove, now the other, or else will crowd one to the exclusion of the other.

This crowding is a source of wear on the ropes and should be minimized as much as is reasonably possible. The standard method of accomplishing this is to locate the drum sufficiently far away to reduce the angle of movement of the rope included between extreme positions to, say, 3 deg. and to make the central position one of exact alignment.

In Fig. 3, let h be the height of the top of the sheave from the axis of the drum and x the horizontal distance between the axis of the drum and a plumb-line dropped from the sheave. The distance from the top of the sheave to the drum center when the rope is in the neutral position will then be approximately $\sqrt{h^2 + x^2}$. Denote by d the total shift of the rope on the drum, this shift being measured parallel to the axis. Denote by 2θ the total angle of shift. We have now,

$$Tan\theta = \frac{d/2}{\sqrt{h^2 + x^2}}$$

Simplifying and squaring,

$$4(h^2 + x^2)\ tan^2\theta = d^2$$

$$x^2 = \frac{d^2 - 4h^2 tan^2\theta}{4tan^2\theta}$$

$$x^2 = \frac{d^2 cot^2\theta - 4h^2}{4}$$

In the present case where $2\theta = 3$ deg., we have

$$x^2 = \frac{d^2\,(38.19)^2 - 4h^2}{4}$$

If $d = 3$ ft. and $h = 25$ ft., we have

$$x^2 = \frac{9 \times 1{,}458 - 2{,}500}{4} = 2{,}655 \qquad x = 51.5\ ft.$$

This means that the axis of the drum should be set 51½ ft. horizontally from the plumb-line down the shaft. If, instead of a head sheave, an intermediate vertical lead sheave were used, we would naturally employ the same formula as regulating the position of the drum relative to that sheave.

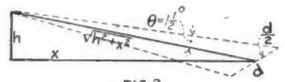
It is recommended by competent authorities that a grooved drum be used for hoisting. The pitch of the groove should be slightly in excess of the diameter of the rope. Thus for 1-in. rope the lowest point in one groove convolution may be placed 1⅛ in., measured parallel to the drum axis, from the lowest point of the next convolution. As a mistake may easily be made in determining the diameter of the rope, let it be clearly understood that this diameter is identical with the diameter of the circle inclosing a cross-section. Since the diameter of a circle is the maximum chord, it will be sufficient to determine the maximum gage of the rope.

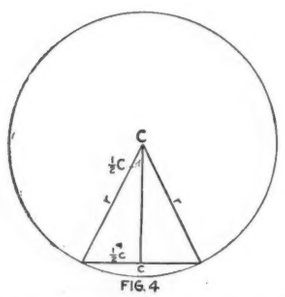
Further, it is preferable that one layer on the drum should contain all the rope that is to be wound. It is considered inferior practice to wind rope on top of rope, layer on layer. In order to cover this requirement, it may be necessary to use a drum of considerable length. This, in turn, may make it necessary to set the drum farther from the shaft in order to keep the angle 2θ to the 3-deg. limit. However, instead of lengthening the drum, one may increase its diameter. We shall in this case not have to set the drum farther away, but we may have to modify the arrangement of gears through which the drum is driven, as otherwise the increase in diameter would give us an increase in linear speed of the rope with a given angular speed of the drum.

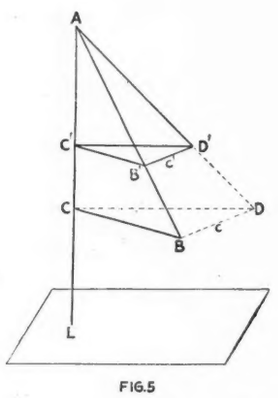
Under certain severe conditions it may be desirable to operate the rope by the combined action of two drums instead of one. In such a case the rope will be made to pass around both drums in one or more loops or convolutions. There are two ways of doing this. In one a single loop around both drums forms a "figure 8"—that is, the rope crosses itself between the drums. While this

method gives a grip to either drum of more than 180 deg., yet it has the fault of reversed curving of the rope. This reversal of bending is considered bad practice and is only to be adopted where unavoidable.

In a typical instance of the balanced Whiting hoist arrangement, however, the two parts of the rope come to the drums on the under side and nearly at the same inclination. The rope is wound round both drums in one or more







FIGS. 3, 4 AND 5. HOISTING ROPE AND GUY DIAGRAMS

convolutions, leaving the space between them perfectly clear. The grip per convolution is 360 deg. or nearly that. This type of hoist is shown in Fig. 7. By observing the arrangement with the auxiliary sheaves, it will be seen that with both drums turning in the same direction, one rope over the head sheaves will be paid out while the other is drawn in.

In the bituminous region the hoisting problem is in many instances to haul the mine cars up and down an incline. There are two principal methods employed—the endless-rope system and the tail-rope system. In the former the rope is endless and moves continuously; the cars are gripped to it and are hauled along; they are ungripped and come to rest. In the latter system there are two ropes, one of which is paid out while the other is being wound in. The one rope—the head line—hauls a train of loaded cars, while the other—the tail line—is attached to the rear car and is simply paid out. Upon the return the tail rope pulls the empty cars back, while the head rope is paid out.

In the one case we have a truly endless line; in the other there are two distinct ropes, or at least there may be two. In the latter system a heavy, strong rope may be used for the haulage of the loaded cars and a smaller, weaker one for the return haul of the empties.

In the endless-rope system there are two special problems. In the first place, since the rope is constantly moving in one direction, it cannot be attached to a drum. The drum or drums must therefore depend upon friction to drive the rope. The second problem concerns the stretching of the rope. There must, or should, ordinarily be some means of caring for this elongation.

The type of rope regarded as standard for haulage is one composed of 6 strands of 7 wires each. Naturally, the wires in a strand are coarser than is the case with a 6x19 hoisting rope of the same diameter. The favoring of this type of rope is probably governed, not so much by any relaxation of the requirement for flexibility as by the practical necessity of avoiding excessive wear. The operation of gripping the moving rope is one peculiarly favorable to wearing down the wires at the crown points of the strands. So stiffness to some extent is permitted because it is desirable to secure resistance to frictional wear.

The speed of an endless-rope system is ordinarily slow, 3 or 4 mi. per hour being representative rates of movement.

The winding of the drums by the "figure 8" method secures frictional grip, because of the large arc of contact, which may total 540 deg. or more per convolution. Both this and also the alternative arrangement of the convolutions without crossing between drums are employed. It is a question of give and take. There is loss of grip with the latter system, but freedom from reverse bending. On the drums it is advisable to employ slip rings for the purpose of equalizing the tension on the rope convolutions. In order to take up slack and provide uniform and uninterrupted tension, a tension carriage or similar device is employed in conjunction with a counterweight.

Bends in the track are undesirable, but usually some are necessitated by conditions. Guide wheels and the like facilitate passing the rope around deflections and bends. It should be borne in mind that the loss of workable strength because of bending stresses is determined by the wheel of minimum radius. Big drums may be installed as well as generally big wheels, yet the rope fail because of one small wheel.

The tail-rope system in the representative cases shown in the accompanying illustrations is driven by two drums. One hauls the head line with the loaded cars; the other hauls the string of empties in the reverse direction. A speed of 10 mi. per hour is good practice in operation. The two ropes may be independently selected for their respective services. Frequently, the tail line is much greater in length than the head line. Standard rope for this system is that which has 6 strands, 7 wires in a strand.

The endless-rope system is operated continuously; the tail-rope system, intermittently. With the former the cars are picked up one by one, so that the shock to the

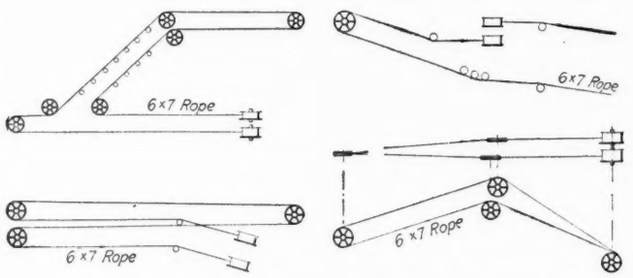


FIG. 6. REPRESENTATIVE TAIL-ROPE SYSTEMS

rope involved in at once overcoming inertia is subdivided. With the latter a whole train is started almost at once.

Permanent guys should ordinarily be made from galvanized rope. Six strands are standard, there being from 7 to 12 wires in a strand. As the stresses on guy ropes are largely fixed loads, the question of flexibility may usually be disregarded. Guys should ordinarily be arranged in such a way as to divide the full 360 deg. of the vertical projection on the general horizontal surface into as many equal angles as there are ropes. Thus 6 guys should be so arranged that the plan projection shows the

various angles as being each of 60 deg. The actual angle between two guys is less, depending upon the elevation of the point of attachment and upon the radius of the circle passing through the bottoms of the guys. Increase of height tends to diminish the actual angle; decrease of radius does the same. Either the actual angles made by the guys or else those projected on any horizontal surface should be equal to one another. If this is the case it is immaterial whether or not the feet of the guys are all in one plane.

The procedure of placing guys may be described representatively as follows: If the general surface is level and unobstructed, lay off a circle and divide it into a number of equal parts, the number being that of the guys to be installed. The several points of division may be laid off by first calculating the length of the chord which subtends the proper central angle. For example, suppose 7 guys are to be employed anchored 25 ft. from the projected base of the stack. The circle is drawn with a 25-ft. radius. The central angle will be $^{360}/_{7}$ deg.—that is 51½ deg. From Fig. 4 we have

$$Sin\ \tfrac{1}{2}\ C = \frac{\frac{1}{2}c}{r} \qquad (2)$$

In the present case

$$Sin\ 25\tfrac{3}{4}^{\circ} = \frac{c}{50} = 0.4345$$

Therefore

$$c = 21.73\ ft.$$

This, then, is the distance that the foot of one guy must be from the foot of the next.

If the ground is not level and the guys require points of anchorage at various elevations, we may proceed in essentially the same way. It is to be assumed always that all guys make the same angle with the vertical. In Fig. 5, E is the base of the stack EA; B and D' are proposed points of anchorage for two adjacent guys. We may first of all calculate c, the proper distance between the anchorages if the shorter guy had had the same length as the longer. Now determine the points B' and C' both in the horizontal plane through D'. The triangles $AC'B'$

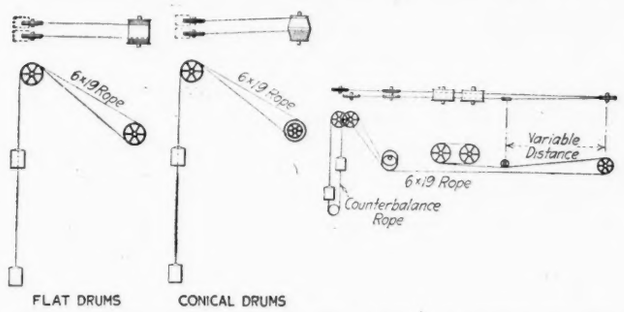


FIG. 7. TYPICAL ARRANGEMENTS OF BALANCED HOISTS

and ACB are similar; so also are the triangles $B'C'D'$ and BCD. The two pairs are connected by the similar sides $C'B'$ and CB. Consequently,

$$\frac{c'}{c} = \frac{AC'}{AC} \qquad (3)$$

From this proportion we determine the value of c', all the remaining quantities being known or readily determinable. Having found c', we test whether B' and D' are at that distance from each other.

A practical example should make all of the foregoing clear. Suppose, as before, that the total number of guys is to be 7. The central angle will accordingly be 51½ deg. Let EA be 40 ft. The elevations of B and D' above the horizontal plane through E, let us assume as 5 and 10 ft. respectively. Assuming that the guy AB is in place and that the points B' and C' have been marked at the same height above the horizontal plane as D'—that is, at a height of 10 ft.—it is required to determine

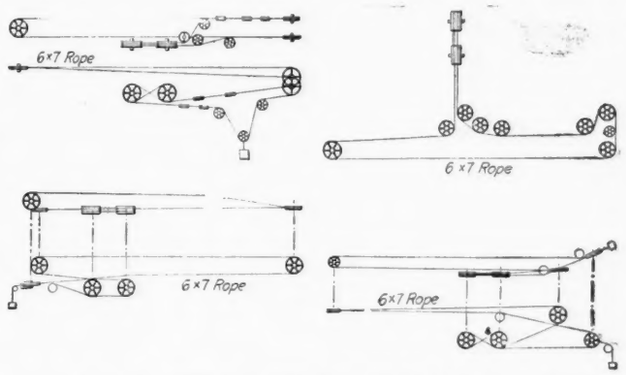


FIG. 8. ENDLESS-ROPE HAULAGE SYSTEMS

the distance c' that the anchorage D' should be located from the point B'. We measure CB. Suppose its length is 28 ft. We have, by formula (2),

$$0.4345 = \frac{c}{56}$$

Accordingly,

$$c = 24\tfrac{1}{3}\ ft.$$

By proportion (3), $AC' = 40 - 10$, $AC = 40 - 5$.

$$\frac{c'}{24\frac{1}{3}} = \frac{30}{35}$$

Consequently,

$$c' = 20.86\ ft.$$

If it has not already been done, we should test whether $C'B'$ and $C'D'$ are equal, as this equality is the condition that the angles made by the guys with the vertical are equal.

A guy rope cannot exert its full strength in staying any structure unless it is horizontal. As a rule this disposition of guy ropes would be inconvenient, to say the least. It is important then to know what the staying strength of any guy really is. The simplest guide is perhaps the following rule: *If the full length of the guy represents its proper and full working strength when acting horizontally, the vertical projection of the guy on the horizontal plane will then by its length show the staying strength of the guy in its inclined position.*

For example, suppose a guy to have an actual working strength (obtained by dividing the rated ultimate strength by the factor of safety) of 1,000 lb. when stressed horizontally; what is its working strength when inclined at an angle of 60 deg. with the surface of the ground? We may solve this problem graphically or by trigonometry. By either method it may be proved that in a right triangle with one acute angle of 60 deg., the short side will be one-half the hypotenuse. The staying strength of the guy in question will therefore be one-half its total working strength, or in this case 500 lb.

In guying any structure it is important to know how many guys will resist any horizontal force such as the

wind. This matter has been investigated, and the table gives the results for any system of symmetrically disposed guys from 3 to 15 in number. In all cases the most disadvantageous result is given, which is of course the only proper condition to assume. The result is given in multiples of one guy. Thus the most disadvantageous application of a horizontal force against a stack stayed by 3 symmetrically disposed guys is resisted by the system with the strength of 0.866 guy.

TABLE OF GUY RESISTANCE FOR SYMMETRICAL SYSTEMS WHEN STRESSED BY A HORIZONTAL FORCE FROM THE MOST DISADVANTAGEOUS DIRECTION

Number of Guys in Symmetrical System	Number of Guys Supplying Total Resistance of the System	Difference
3	0.866	....
4	1.000	0.134
5	1.538	0.538
6	1.732	0.194
7	2.193	0.461
8	2.414	0.221
9	2.835	0.321
10	3.078	0.243
11	3.494	0.416
12	3.732	0.238
13	4.120	0.388
14	4.381	0.261
15	4.757	0.376

As an example of the use of the table consider a 10-guy system. The wind may come from a direction such that it is resisted by the strength of 3.078 guys. If one guy (after using the factor of safety and allowing for deviation from the horizontal) possesses a resistance of 500 lb., then the stack may be counted upon to be held, by the whole system of 10 guys, against the wind up to a total pressure of 1,539 lb.

An examination of the table will justify a claim that any system involving any odd number of guys is not greatly inferior to a system containing one more guy. Thus a 9-guy system resists with the strength of 2⅚ guys, while a 10-guy system adds to the resistance only that of one-quarter of a guy. We thus get a rule making for economy: *Seek always to use an odd number of guys.*

Aërial tramways are but little used in American coal mines for the purpose of delivering coal from the mine to the railroad. The capacities economically available are perhaps too low to warrant us in expecting extensive development in this direction. However, that remains to be seen. On the other hand, the aërial tramway seems to offer an economical means of disposing of refuse. This would appear to be especially the case in mountainous regions such as certain districts in West Virginia, Virginia, Kentucky and Tennessee. The aërial tramway cares nothing for steep declivities or mountain streams. Give it its proper points of suspension, and but little more will be required.

An aërial tramway will use a number of wire ropes, none of which calls perhaps for our present attention except the one which provides, in effect, a suspension bridge or suspended track upon which the load may be hung and transported. This cable is advantageously made of locked-wire rope. It is not a stranded rope at all. There are, however, various layers of wires, the outermost consisting of wires so formed as to interlock with one another. A number of the layers, beginning with the exterior one, may have their wires wound in different directions. Thus the outside layer may have wires running in a left-handed helix, while just beneath it is another layer with wires running in a right-handed helix. The outer wires are flattened both on the convex surface of the layer and on the concave. One or more other layers, similarly flattened, lie beneath.

This flattening of wires is not to be confounded with the flattening of strands employed in certain types of rope. Here it is the wire itself that is flattened. The central core may consist of a number of layers of round wires. At the very center is a round wire; no hemp is employed.

The foregoing is representative of a fairly typical high-grade locked-wire rope. Doubtless there are others formed differently. The flattened wires on the outside enable the rope to present a fairly smooth cylindrical surface. It thus affords a highly suitable track or rail upon which the cableway carriage may run. This rope is well suited for the service indicated. It is not approved American practice to use this rope in hoisting or haulage.

The determination of the tensile stress exerted in the main rope of a cableway is rather complicated. Competent advice should be sought. Suffice it to say here that, other things being equal, the greater the sag the less the stress.

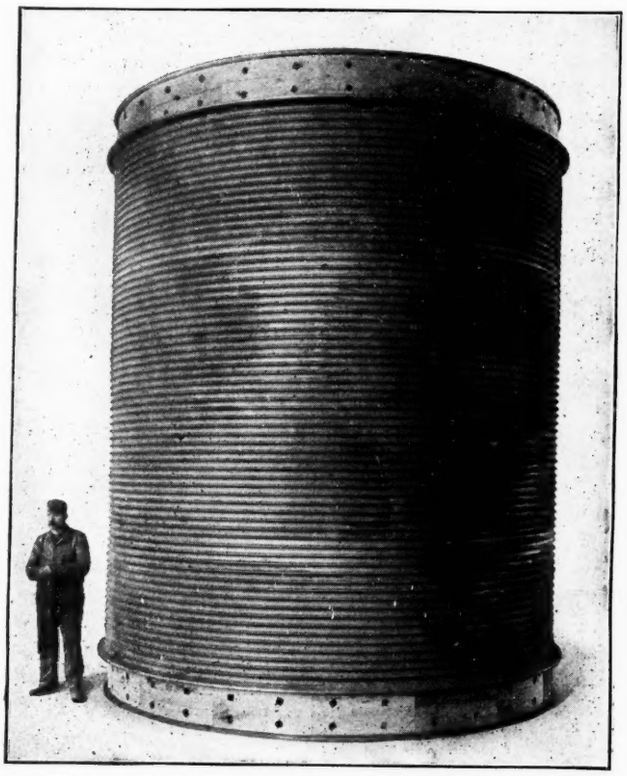


FIG. 9. A LARGE GROOVED CYLINDRICAL HOISTING DRUM

A number of other special types of wire rope have been placed upon the market. There is, for example, the flattened-strand type. In this, the various strands are given an elliptical or other cross-section with a comparatively flat exterior. The strands are so shaped and disposed that an increased number of wires are brought into direct contact with sheaves and drums over which the rope operates. The effect is to distribute more widely the frictional wear and thus prolong the life of the rope in so far as that life is dependent upon external friction. Perhaps the most highly approved form of cross-section of the strands is one that may be described as an equilateral triangle with the corner wires omitted. One side of the triangle is placed in the circumference, thus presenting a number of wires.

Flattened-strand ropes are made with Lang's lay. This type of lay means simply that the strands are twisted in the rope in the same direction in which the wires are twisted in the strands. In regular lay, a left-hand twist of wires is accompanied by a right-hand twist of strands, and vice versa. Lang's, or simply Lang, lay rope is more readily untwisted than regular lay. The flattened-strand rope with its Lang lay is suited to many hoisting and haulage conditions, but not to all. In a given case the expert advice of the high-grade manufacturer may profitably be sought.

The flat rope is still another special type. A typical example consists of a number of wire ropes of few strands each, which are laid side by side and sewed together with Swedish iron or steel wire. The individual ropes have their strands twisted some in a right-hand helix some in a left-hand helix, the two varieties alternating. Curling or spinning of the rope ribbon is thus minimized.

There are several advantages connected with flat rope. In the first place, it may be wound, coil upon coil, on a reel whose groove is but little wider than the ribbon itself. Such rope may be had in widths varying from 1¾ to 8 in. and in thickness from ¼ to ⅞ in. It will not spin or twist in the shaft and is otherwise also well suited to deep hoisting in vertical shafts. One advantage consists in the fact that it may be wound on drums of small diameter. If D be the diameter of the drum at the bottom of the rope groove, S the sheave diameter, and t the thickness of the rope, experience would dictate the following proportions for rather deep hoists: $D = 100t$, $S = 160t$. If the rope is to be comparatively short, then D and S may be smaller. The sheaves should have deep grooves, and the bottoms of the grooves should be slightly convexed.

Steel-clad rope is made up of strands of wires wound upon a hemp center and the several strands covered with a helically wound steel ribbon. Wear is taken by this sheathing. When the sheathing is worn out, the rope itself remains.

Extracts from a Superintendent's Diary

Experienced politicians have learned that there are very few men in our camp who actually vote, and they have also found that all of these voters look pretty much alike when they are on their way home after a day's work, provided they are encountered before they pass through the bathhouse. For that reason we are given the "go by" by most of the veteran campaigners, as they do not feel like spending a night at our camp, and that is what is required if the men are to be addressed under favorable auspices.

All politicians, whether new or old at the game, rightly assume that laboring men are seldom satisfied with their treatment or surroundings, and in consequence they say uncomplimentary things about all employers whenever they have an opportunity to get in a few confidential words with a group of laborers. This explains why the ability to distinguish a laboring man under all circumstances is of so much importance to the politician, since a single error might turn the vote of an entire community.

Occasionally, however, a young aspirant for high honors joyously comes our way in search of votes and in anticipation thereof scatters a liberal supply of cards bearing his photograph and a modest statement as to what he hopes to accomplish if elected.

Today, Jesse D. Rowan, a young lawyer, candidate for Congress from our district, came into camp to explain to our men just why they should support him in his race. Running on an anti-corporation platform, he evidently felt some hesitancy in feeling the officials out first, as he drove by the office and commissary without making his presence known and took up his stand near the pit mouth about quitting time.

The first man out happened to be Lewellen Adams, a mine foreman. The Hon. Jesse D. Rowan met him with a smile, a cigar and an extended hand; the fun started almost immediately thereafter. Lewellen Adams has little love for the miners' union, and he has a positive contempt for anyone who even suggests that the laborer should have a larger voice in the management of industry. He once operated a small contract mine and was thrown into bankruptcy by the union preparatory to its tying up all the mines in this district, and he has never been able to get enthusiastic about the rights of the laborer since then.

Mr. Rowan's first remark made him realize that Lewellen was not a miner, and he would willingly have closed the argument at that point, but unfortunately for his success, several miners had come up to find out what was going on before Lewellen began to return the argument, so the aspirant for Congress was compelled to defend his views.

Most of the miners admit that Lewellen got more than was coming to him when the union put him out of business, so they do not hold his rabid anti-union views against him. When they found him getting in close quarters in his argument with the politician, they nobly took sides with him, and Mr. Rowan was led to believe that in our camp he would find little sympathy for the views that he had believed only yesterday would make workingmen everywhere willing to die for him.

Was ever a politician in a worse predicament? Pink Jones, trapper, saved the day for the Honorable Jesse. "Say, Bud," he remarked; "You're trying to fire this bunch with the wrong kind of fuse. Cut out the argument and hand out more smokes."

When I passed along a little later, everyone was happy, even Lewellen Adams.

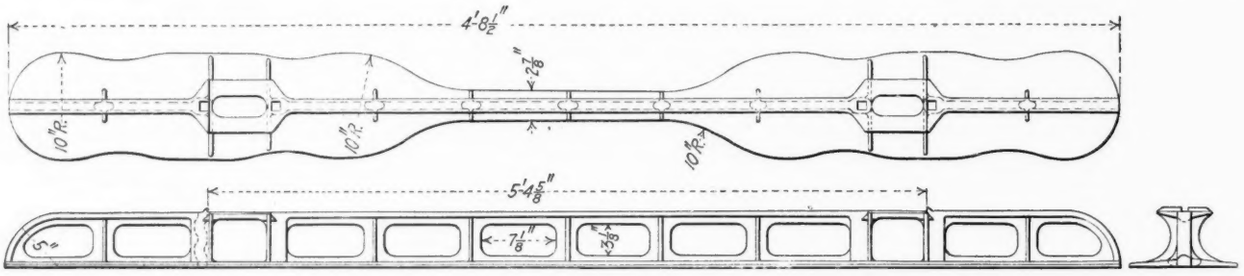
Sodium Chloride, or Common Salt, Is Found in the Coals of South Yorkshire, North Derbyshire, the Stoke district of Staffordshire and in other parts of England. It injures the linings of coke ovens most seriously, and as it is finely comminuted it cannot be eliminated in washing the fuel before firing. One hundred grams of coal (ground and put through a sieve having 12 meshes to an inch and afterward passed over one having 50 meshes to remove dust) lost only 0.38 out of 0.794 grams of the salt in four hours' immersion in water. Another sample of similar fineness lost only 0.36 out of 0.618 grams in the same time. The salt does less harm at a high temperature than at a lower one, and its bad effects can be reduced by making the refractories lining the oven as dense as possible on the heated face. When the salt is heated to a low temperature, the vapor passes into the pores of the brick wherever the salt glaze is broken and destroys the material back of the glaze which has retained a higher degree of heat than the face, thus producing liquidity, porosity, honeycombing and rottenness of structure in the very heart of the brick. At a higher temperature of the exposed face the salt passes off without injury, as in a salt-glazing oven where the salt is added at the correct temperature to exactly accomplish the desired results.

New Apparatus and Equipment

Maryland Metal Cross-Tie

A new type of cast-steel cross-tie designed for railroads, mines, etc., is being placed on the market by the Maryland Cross Tie Co., Baltimore, Md.

The chief purpose in the design of this tie was to provide a substitute for the present wood tie, which might be readily used in conjunction with the latter either for replacement or new work. Provision was also made for insulating the rail from the tie where electric signals are to be employed. The detection of defective insulation is made easy by the use of this tie.



TOP AND SIDE VIEWS OF A NEW CAST-STEEL CROSS-TIE FOR USE IN COAL MINES

The tie is a single annealed basic-steel casting, and for standard-gage roads is made with a base flange 10 in. wide, upon either end, with the width decreased in the center of the tie to prevent center binding or the floating of the tie when supported in the center but not on the ends. From the center of the base flange a skeleton vertical flange is run upward to a height of 5 in., upon which are provided suitable rail seats at the proper distance apart. A shoulder is provided at the outer edge of each rail seat to prevent the rails from spreading. This does away with tie-plates.

On either side of the rail seats a hole is cored through the entire depth of the casting. This is provided with cast lugs upon either side so that when the ordinary railroad or dog spike is driven into the tie to hold the rail in place, it is bent from side to side, and since it thus assumes a sinusoidal form, the rail is held securely in place without any other fastening.

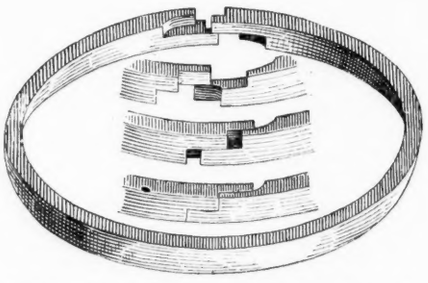
If the tie is to be used with rails of different base width, it is an easy matter to cast the spike hole of such a size that a shim may be used alongside of the spike. It is thus possible to vary the distance apart of the spikes by as much as ½ in.

A spike driven into the sinuous spike hole of this cross-tie acts as does one driven into wood except that it acts better. If an attempt is made to pull the spike, its holding power attains its maximum after it has been withdrawn a short distance, whereas the spike driven in wood rapidly decreases in holding power as it is withdrawn. The spike driven in this steel tie retains its holding power at nearly the maximum amount until it has been withdrawn at least 1¾ in. A spike that has been driven into one of these ties and then removed may be used again exactly as may one that has been driven in a wooden tie.

The advantages claimed by the makers for this tie are that all bolts, nuts and rivets have been eliminated so far as attaching the rail to the tie is concerned, while the use of the most satisfactory rail fastening ever known to American railroads—the spike—has been retained. Rail spreading has been overcome and automatic gaging established. Throat cutting of the spikes, as well as shearing, has been prevented, while the alignment of the track is more easily maintained. Center binding of the ties has been eliminated, while the life of the rail has been increased by making it easy to cant it upon curves, etc., to the position where the wear may be most easily resisted. The necessary resilience of the track has been secured, and ballast crushing has been overcome. A tie for a standard-gage track weighs about 125 lb. These ties may be used either for replacement or in entirely new work, and are cast in one piece.

An Interlocking Piston Ring

A piston ring with interlocking joint, as shown, has recently been placed on the market by the Chalsmith Sales Corporation, 2 Columbus Circle, New York City,



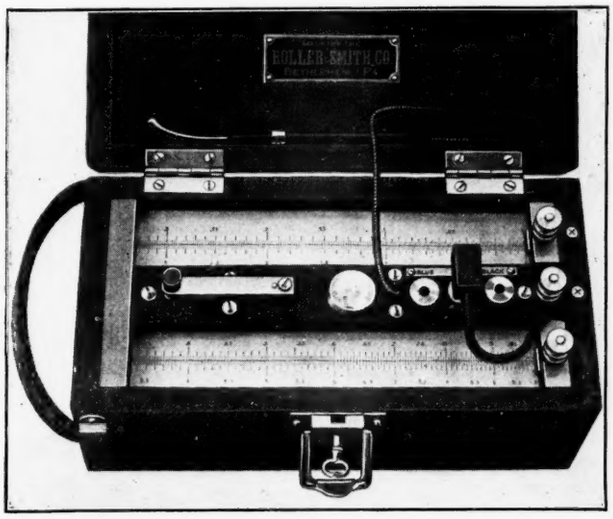
A PISTON RING WITH INTERLOCKING JOINT

and is made in the usual variety of sizes. These rings are made of gray iron cast singly. The skin of the iron is left on the inside, to insure resiliency. The joint is machined to close limits and is practically gas-tight. It can open from $\frac{3}{16}$ to ¼ in., before gas will escape.

Direct-Reading Ohmmeter

The direct-reading ohmmeter shown is the latest modified form of the type of portable ohmmeter made by the Roller-Smith Co., 203 Broadway, New York City, and was designed especially for measuring the resistance of relay points in electric signaling systems.

It is in general a slide-wire bridge having self-contained galvanometer of sensitive but rugged design, self-



PORTABLE DIRECT-READING OHMMETER

contained dry cells which are conveniently located for renewal, galvanometer key, stylus and self-contained resistances.

The case is of hardwood, highly polished and provided with hinged top, latch and lock and leather handle. There are three ranges—0-1, 0-10 and 0-100 ohms—each on a scale 15 in. long, each scale being of a different color—namely, blue, red and black. Means are thus provided for making all relay-point tests as well as many other resistance measurements within the range of the device quickly and readily.

Measuring Locomotive Coal

The accompanying illustration shows a loading device for railway coaling stations whereby the usual difficulties in the way of keeping close record of the amounts of coal delivered to the various locomotives are avoided. It consists essentially of a measuring hopper of one-ton capacity, having a feed gate at one end to admit coal from the elevated storage pocket or bin and at the other end a discharge gate through which the coal is directed into the inclined chute that delivers it to the tender. The two gates are so connected by mechanism that they work in sequence.

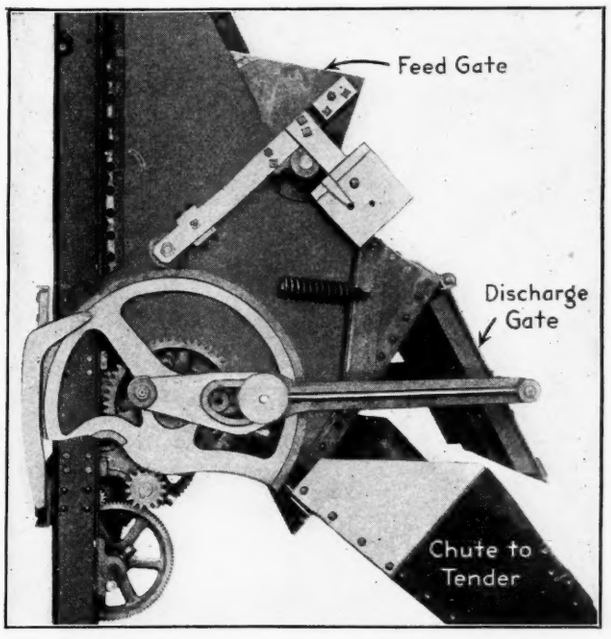
The mechanism is operated by a ¾-hp. electric motor, or by means of a hand chain at stations where current is not available. The main shaft makes four revolutions per minute, and with each revolution the measured quantity of 40 cu.ft. of coal (equivalent to one ton) is delivered to the tender.

The locomotive is spotted with its tender under the hinged chute, which the fireman (standing on a platform) lowers by a chain. He then throws the handle of the controller to start the motor. The feed gate, being opened, admits a charge of coal to the measuring hopper and then closes. As soon as it is closed, the discharge gate is opened, allowing the coal to flow to the chute and tender.

As soon as the discharge gate is closed, the feed gate again opens and the operation is repeated, delivering a measured ton of coal every 15 sec. When a sufficient supply has been taken, the fireman throws the controller handle to stop the loader and then raises the chute. This chute has a hooded end, so that the coal drops vertically at the center of the tender.

The amount taken by each engine is recorded by a counter placed on the coal bin, the figures on which are easily readable from the engine. The fireman marks on his coal ticket the number of his engine (say 452) and the date. When the engine is spotted at the coaling station, he marks the number shown by the indicator on the loading device (say 250). After the tender has been filled, he again notes the number shown (say 257). Thus it is evident that engine No. 452 has taken seven tons of coal. As the first number on each ticket must correspond with the last number on the previous ticket, any attempt to show a lower amount of coal than actually taken would be readily apparent to any one checking up these figures.

At the coaling station of the Nashville, Chattanooga & St. Louis Ry. new terminals at Cowan, Tenn., all coal is delivered and recorded by four of these loading devices, and during the period Apr. 17 to May 15, 1916, there were 4,623 tons delivered. A test made with one of the



MEASURING LOADER FOR RAILWAY COALING STATIONS

loaders showed that 15 tons recorded actually weighed 30,270 lb. on the scales; this is an overweight of only 18 lb. per ton and is abundantly accurate for all ordinary purposes.

This device has been applied at a number of coaling stations. It is known as the Rands measuring coal loader and is built by the Roberts & Schaefer Co., engineers and contractors, of Chicago.

Freight Rate on Boiler Size

It now seems likely that the difficulty in applying a freight rate on the new anthracite "boiler fuel" will be adjusted in a short time. The companies offering this size have announced that this fuel will be screened through a $\frac{5}{16}$-in. round mesh and over a $\frac{3}{32}$-in. round. It will be observed that the first-named mesh is the largest for rice, or No. 2 buckwheat, although some companies use a mesh $\frac{3}{8}$ in. round, while the latter size is the smallest for barley, or No. 3 buckwheat. Inasmuch as the size is now definitely fixed, it will in all probability take the same freight rate as "buckwheat and smaller," as the tariffs now specify the small sizes, all being at the same rate.

When the new size was originally announced it was stated that it would contain 60 per cent. rice and 40 per cent. barley, and its price was fixed at those proportions, as 60 per cent. of the rice price of $1 would be 60c., which, added to 40 per cent. of the barley price of 75c., or 30c., gives the present "boiler" price of 90c. It seems to be a question, however, in the minds of some if the screen sizing as announced will maintain the relative proportions of each size in the new one.

New Anthracite Sizes Out

While it is far from generally known yet the fact that the change has been made in the anthracite sizes is fully established by a number of cars of coal that have arrived. It seems that the change has not been made simultaneously by the mining people, but has originated among those shipping from the Hazleton and Wyoming regions. Upon the arrival of the coal the consignees immediately protested to the shippers, but were flatly told in most instances that the coal was correctly billed as to size and was as good as they could expect in the future.

The new sizes or, to be more exact, the change in preparation is as follows: Egg and stove screens made $\frac{1}{8}$ in. larger; chestnut and pea screens made $\frac{1}{8}$ in. smaller; buckwheat No. 1 screen made $\frac{1}{16}$ in. smaller. While this would not at first seem to indicate a very radical change, yet the pea coal shipped under the new sizing is described by one dealer as "simply miserable." When tried on one of the grates used in a stove for house heating, it ran through to the ashpit.

The statement is made that by June 24 all the screens in the coal regions will have been changed to conform to the new sizing. It is understood that it was the intention for all the companies to begin the shipment of the new sizes at the same time, but that they were prevented by the delay incident to replacing so many screens.

At this time it is not possible to learn the general attitude of the trade as to the new conditions, but as already stated in these columns, one of the very largest retail dealers in Philadelphia has employed an experienced inspector from the mining regions to examine every car of coal shipped to him and has reiterated his intention to reject every car that does not meet the old standard of preparation.

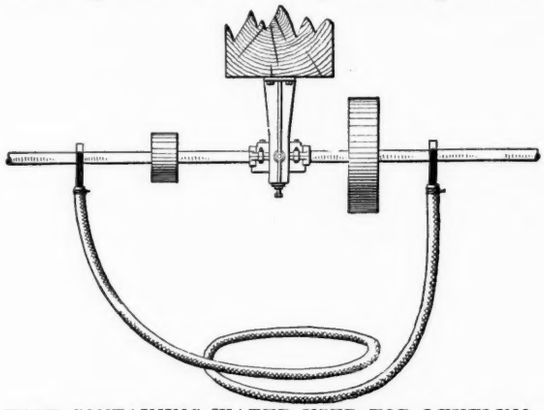
The entire subject from its earliest inception seems to have been of a most mysterious nature. While the matter has been discussed for many years, the rumors in the present instance seem to date back only a year or so. Later the rumors seemed to become established on a substantial basis, and it was taken for granted that the new sizing would go into effect during the present spring, but the negotiations with the miners appeared to upset that plan and it was then learned that the change would not be made until late in the fall.

Why the plan has been launched so suddenly at this time is not known, and the whole subject still seems to be shrouded in mystery. When the sales officials of several of the big shipping companies in the lower anthracite region were told that the new sizes were being shipped by other companies, they professed entire ignorance of the subject, nor did they seem willing to venture an opinion as to whether their companies would adopt the same plan. They did admit, however, that if such a plan was contemplated, they would not likely receive any advance notice of the intention.

A Simple Shafting Level

By S. F. Wilson

To level shafting or to ascertain the relative levels of two points some distance apart which cannot conveniently be reached with a straight-edge, it is quite a common practice among millwrights, builders and others to take a common garden or other hose, insert a glass tube in each end, and fill the crude apparatus thus constructed with water almost to the tops of the tubes, as shown in the illustration. From the level of the water in the two tubes the inequality of level between any two points compared can be ascertained with accuracy. I recently saw a backwoods mason level the foundation for a small building with a hose. He did not use the glass tubes but the result was entirely satisfactory.—*Power.*



HOSE CONTAINING WATER USED FOR LEVELING

COMING MEETINGS

American Society of Civil Engineers will hold its annual convention at Pittsburgh, Penn., June 27-30.

The American Mining Congress will hold its 19th annual session during the week beginning Nov. 13, 1916, at Chicago, Ill.

Michigan-Ohio-Indiana Coal Association will hold its annual convention at Cedar Point, near Sandusky, Ohio, Aug. 1, 2 and 3. Secretary, B. F. Nigh, Columbus, Ohio.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its next annual convention on July 26 and 27 at Madison, Wis.

Byproduct Coke Producers' Association of America will hold its first annual meeting in Boston, Mass., on July 14, lasting probably two or three days.

National Safety Council will hold its next meeting in Detroit, Mich., Oct. 17-20. Secretary, W. H. Cameron, Continental and Commercial Bank Building, Chicago, Ill.

The Labor Situation

General Labor Review

In the anthracite region the largest company, the Philadelphia & Reading Coal and Iron Co., after a strike made concessions to the miners relative to the hours of contract miners. Under this new arrangement miners who have ill-ventilated places or are for some reason unable to continue working for the full 8 hr. are entitled to obtain permission from the mine foreman to leave the mine early.

Other concessions are also made. The demands of the miners were not unreasonable, but they were unlawful as the matters demanded are not provided for in their contract. They had a perfect right to ask for what they desired, but no right to strike to obtain that end. Another strike has taken place to compel union miners to pay their dues. The men who were thus compelled to support the union were former members of the Industrial Workers of the World.

Local Disputes in Central Pennsylvania

In central Pennsylvania the miners of the Jefferson & Clearfield Coal and Iron Co. and the Rochester & Pittsburgh Coal and Iron Co. are not satisfied. A special convention was held in Punxsutawney, Penn., on June 14. The miners maintain that for some classes of day labor a lower rate of pay obtains than in other parts of the district.

It is reported that at Edri, in the lower part of Indiana County, a number of men who have been on strike at the Foster mine returned to work on June 12. They were brought to this decision by the eviction of 25 families from the company houses, the heads of these families being the ringleaders in the strike. It is said that 12 families have been evicted at Hicks, where also there has been a strike.

The conspiracies of certain union officials in western Pennsylvania to injure a miner and fireboss who did not please them when he measured up work in the mine has resulted, after a jury trial, in a verdict for the complainant of $199.22. The plaintiff was John Dhayer, of Bulger. He was employed by the Verner Coal and Coke Co. The defendants were John Bukalich and others, members of the local union at Bulger.

In the Pittsburgh district the Pittsburgh Coal Co. refuses to settle, but the Vesta Coal Co., an important interest, and some other companies have made or are preparing to make concessions.

Union Expels Members for Quarter Century

In Ohio the union has severely disciplined those miners who have been working for low wages in subleased or cooperative mines while retaining their affiliation with the union and pretending to conform to its rules. The Coshocton miners seem bent on striking in opposition to conditions under which they receive no extra pay for taking down draw slate, or "false" roof, and for car pushing. This they claim was promised to them. In the Hocking Valley district the operators intend to collect $1 from each man that attends a funeral merely for the purpose of securing a day's outing—a lugubrious pleasure one would think, at best.

The suit of the president of district No. 14, Alexander Howat, against those who said he had received bribes was partly successful. The success was against the man who said that he paid the bribe to Howat, and so the latter is completely vindicated. The other persons were not found guilty of slander, the jury apparently being of the opinion that the defendants thought that the statements they made were true. It is hoped that Howat's vindication will settle the deadlock in the Southwest and make possible an agreement between the operating companies and the mine workers.

It is interesting to note that the jury gave Howat a verdict for $7,000, the exact amount that Hazen was supposed to have received to hand over to Howat as a bribe. Of course the payment will now be made not as a bribe, but as a payment for slander, and Howat's reception of the amount intended for him will be unassailable.

In eastern Kentucky more than 1,000 miners employed at the Straight Creek mines of the Federal Coal Co., have reached an agreement with the operators and returned to work. The miners of the Continental Coal Corporation in the same field also have resumed work under conditions similar to those existing before the strike. The miners at Kettle Island and Wallsend are still on strike having failed to adjust local differences.

Anthracite Miners' Unrest

Contrary to existing reports, the employees at the Nesquehoning colliery of the Lehigh Coal and Navigation Co. are not on strike. Nevertheless there is a great feeling of unrest prevalent in the Panther Valley, and dissatisfaction with the hours of labor is still causing trouble. It is hard to explain the action of men who will strike in the coal region for an 8-hr. day and yet will secure jobs at other towns at plants where they have to work 10 or even 12 hr., and where the rates of pay are really lower than those paid to that class of labor at the mines.

It is probable that away from home the mine workers are more disposed to work long hours than to idle away their time, because in the new town they have neither home nor friends, nor accustomed haunts in which to spend the evenings. Moreover, the work is new and by that token exciting. Besides, it is regarded as only a temporary employment and the undesirable conditions only a momentary annoyance. But already some of the men who heeded the siren voice of the labor agents are returning to the mines and are glad to get back.

Industrial Workers of the World Active

The Industrial Workers of the World are still trying, somewhat vainly, however, to make an impress in the anthracite region. At Miners Mills, Luzerne County, near Parsons and Wilkes-Barre, the burgess, Frank Ward, forbade the I. W. W. followers to hold a meeting in the Finn's Hall, advertised to take place June 14.

Prompt work by the State Constabulary in dispersing the crowd that flocked to the proposed meeting of this law-breaking organization prevented the plans of the I. W. W. from being carried out. The lawlessness at Old Forge, Dupont and Pittston near-by and the open way in which the I. W. W. advocates the destruction of property fully justify the authorities in suppressing the activity of this organization.

Strike to Compel Filing of Wage Schedule

At the Haddock colliery of the Plymouth Coal Co. there has been a strike for two weeks, which came to an end on June 5. The company had failed to announce the new rates of pay provided in the new contract as that agreement provided. The company alleged that it had not had sufficient time to prepare its schedule.

In order to force the exclusion of Industrial Workers of the World from the Seneca colliery of the Lehigh Valley Coal Co. for nonpayment of dues, the men at that operation went on strike Saturday, June 17. There were about 100 I. W. W. men who had joined the union but did not desire to support it. On the following day a mass meeting was held and the men were reinstated in the union, and on Monday, June 19, the short strike was ended by the return of the men to work.

Reading Company Capitulates

The Philadelphia & Reading Coal and Iron Co. capitulated to its men on Thursday, June 15. The miners at the Maple Hill, Ellangowan and Knickerbocker collieries at Shenandoah and Mahanoy City had been on strike for a week. It was the trouble common to the anthracite region, which caused the strike—the 8-hr. day clause in its application to contract miners.

But the capitulation has been misrepresented. The company by no means agreed under all conditions to hoist men when a number of them present themselves at the foot of the shaft. The wording of the agreement is reported as follows, though the word "no" has been added to the statement furnished, as it seems consonant with the intended meaning:

Must Work as Long as Work Is Available

A miner is required to work 8 hr. at the working place, exclusive of noon time, and can only be excused where abnormal conditions as to ventilation exist or where (no) other work can be performed on that day to load cars, to advance the work, to timber or protect the place. Miners excused as above will be hoisted when they arrive at the bottom of the slope or shaft.

The new reading of the agreement is not unreasonable if the miners do not try to stretch its provisions. Men who are anxious to quit work will always find an excuse, and one somewhat pities the foreman who has to put such an enactment into operation. He is but poorly remunerated by a $5 increase in his salary and $2.50 back pay for all the new difficulties this rule will give him.

After all, the P. & R. C. & I. Co. is not alone in its concession for the Lehigh Coal and Navigation Co. was reported some time ago and probably with truth as being ready to excuse men whose places were ill ventilated or unduly warm.

Why the Miners Should Do a Full Day's Work

For several reasons the operators do well to keep the contract miners below so long as they can do the work required of them. These reasons are: (1) To protect the laborer, (2) to produce a full day's output, (3) to distribute that output over the whole day and (4) not to interfere with the hoisting of coal.

W. J. Richards has handled the matter diplomatically and it is to be hoped that the men, having compelled a change in the contract by an unlawful duress, will observe the new agreement to the letter. There is no question that if they do, their earnings will be larger and there will be more content around the mines. The miners have no right to proclaim that they cannot earn a living when they will not even half try.

The strike at the Lincoln colliery was discussed concurrently with that at the Maple Hill, Ellangowan and Knickerbocker collieries, with apparent possibilities of a speedy settlement. It was agreed also that where engineers were put on an 8-hr. day in 1912 and now are put on a three-shift instead of a two-shift turn, the turns shall "alternate."

Miners Need Not Wait on Blacksmith's Work

The miners can now leave their tools at the blacksmith shop at the close of the day, and they will be sharpened by the blacksmith working overtime. Formerly the miners had to wait till the picks were sharpened and were required to carry them home. Each miner will receive a check, and the tools will be kept in a safe place till morning.

This also is a change for the better, as the old arrangement was undesirable, but it is a change in violation of the agreement and increases the cost of coal to the Philadelphia & Reading Coal and Iron Co., though the charge is of course small. Everyone will wish that contracts so newly made might be kept in their entirety without revision by striking employees.

Pittsburgh Strike Continues

The mass meeting of the miners of District No. 5 was held, as stated last week, on Monday, June 12, at the Turner Hall in Monongahela, Penn., to protest against the contract made by the district officials with the mine operators. Under the presidency of Leroy Bruce, of Roscoe, Penn., they passed a resolution providing for a formal protest to the international executive board against its recent order requiring the men to return to work under the agreement signed on their behalf.

A second resolution declared that the miners were prepared to accept an agreement consonant with the provisions of the McAlpin contract, but would not accept the subsidiary agreement made for the miners by District President Van Bittner and Vice-President Hanaway.

At Bridgeville 2,000 Miners Vote No Work

On the afternoon of the same day 2,000 miners, members of subdistricts Nos. 1 and 2 of district No. 5, met in the Bridgeville baseball grounds and decided not to return to work till the new scale committee could arrange satisfactory working conditions with the Pittsburgh Coal Operators' Association. The miners' new scale committee, consisting of Leroy Bruce, Harry Delbar, Michael Barry, James Phillips, John McCartney, James Jefferson, P. J. Murphy and Andrew Pushcar, had at that time conferred three times with the coal operators' association without reaching an agreement.

But the scale committee is prepared to untie the knot by bringing pressure to bear on the independent operators, most of whom are more amenable to argument and more anxious for a settlement than the Pittsburgh Coal Co. and the Monongahela River Consolidated Coal and Coke Co.

These other concerns do not have sources of supply elsewhere. Some of them are quite grievously in need of coal, and some are to be brought into line by the promise of an exodus from the mines of the resisting companies to those which are more amenable. Nor is the excellence of the arguments of the miners the least of factors in their favor. Not a few operators must feel hurt at losing profitable business, not for the sake of a principle, but to obtain something for which in a duly signed instrument they have agreed not to ask.

Vesta Coal Co. Makes a Separate Settlement

Under the circumstances it is not strange that the independent companies show a disposition to follow the direction their inclination and their promises alike lead. Thus the Vesta Coal Co., a subsidiary of the Jones & Laughlin Co., agreed to give the McAlpin wage scale and the working conditions of the agreement of 1914. The miners are content with this arrangement and will go back to work wherever it is granted, thus showing their disposition to do what is fair.

When the miners from 74 locals met again at Monongahela on Wednesday, June 14, the report of the committee contained the account of the arrangement at the Vesta mines, perhaps the largest unit operations in point of view of daily tonnage in the world. The meeting decided not to take any action till the return of the scale committee from Indianapolis, where it expected to go on Tuesday, June 20.

However, the executive board of the Pittsburgh district met with the international executive board at Indianapolis on Friday, June 16, and laid the matter before the international union officials, and as a result the miners' leaders decided to visit Pittsburgh at an early date in the hope of settling the controversy.

Some of the Union Mines Are Still at Work

At the close of last week the mines of the Vesta Coal Co., the Pittsburgh Terminal Coal Co., the Pittsburgh & Westmoreland Coal Co. and about 15 mines of the Pittsburgh Coal Co., and one of the United Coal Co. were at work. Other mines had started and had stopped again.

As usual the strike has had its unpleasant features. At the Creighton mines of the Creighton Coal Co., Leon Pickard, who was trying to go to work, was blinded by pepper cast in his face. A number of misguided women seem to have been back of this brutal attack, which has placed Pickard in a serious condition. Three women have been arrested for the crime.

Louis Federkiewicz, a former leader at the Creighton mines, has been arrested for carrying concealed weapons. He was tried before a New Kensington justice on June 14 and held for court in the sum of $1,000, which he could not furnish. When arrested on June 13 for disorderly conduct he was found to have a revolver and 13 cartridges on his person.

Ohio Mine Labor Difficulties

The United Mine Workers in Ohio, as in Illinois, are bitterly opposed to those miners who enter into coöperative arrangements under which they accept wages that are below the union scale. The miners demand and receive wages in accordance with the general wage scale, and then, when the time comes for payment, agree to stand whatever loss is found to result from the expenses of the business. The union rightly claims that the scale is thereby rendered null and void, and the competition of these violators of the scale agreements make it hard for the regular operators to pay their men.

Ninety-six members of the United Mine Workers of America, located in the Hocking Valley district, have been suspended for 25 years by the officials of the organization for working in subleased and coöperative mines. The miners affected are working in the Nelsonville, Shawnee, Sand Run and Carbon Hill sections. They are accused of leasing old mines during the long suspension and operating them on the coöperative basis. The matter had been up for discussion by union officials for several months before the drastic action was taken.

Coöperative Mining Violates a Union Rule

Article 13 of the subdistrict constitution makes the following provision covering subleased and coöperative mines:

> Any member of our organization who leases or forms a cooperative company to lease mines, thereby throwing our members out of employment or failing to comply with the contract provisions of the Hocking district in every particular, upon conviction shall be suspended from membership in our organization from 5 to 25 years, and shall never be eligible to hold office or represent the United Mine Workers in any capacity.

There are some fears of a strike in the Coshocton district, where the miners claim they have not received concessions guaranteed them after the long 14-month strike ended a year ago. About 700 miners are affected. The miners claim that they are not paid as agreed for the handling of draw slate, and they demand pay for pushing empty cars from the entry to the working face.

The men at the Troll mine at Maynard struck on June 6, following a disagreement with the management as to the lifting of "sticky bottoms"—coal which adheres to the floor of the room. It is said that the men, all of whom on June 9 went back to work, will now lift this coal without more ado.

Promiscuous Mourning Not To Be Permitted

Steps are to be taken by several of the Hocking Valley operators to enforce the nonstrike agreement signed at the recent wage conference. Under that contract the miners can be fined for quitting work unless they can allege that there has been a failure to pay promptly or that the scales are out of order.

It has been the custom to attend funerals at will, whether the persons so attending are related to the deceased or not, and one of the New Pittsburgh Coal Co.'s mines was closed recently for that purpose. The companies now propose to enforce the fine of $1 per day per man under the agreement. The decision of the operating company has the backing of the state officials of the miners' union.

President Howat's Slander Suit

The $50,000 slander suit against Charles S. Keith, president of the Central Coal and Coke Co.; the Central Coal and Coke Co., the Southwestern Interstate Coal Operators' Association, Joseph H. Hazen, Mulberry, Kan.; Ira M. Fleming, president of the Fleming Coal Co.; the Fleming Coal Co., W. J. Jenkins, president of the Western Coal and Mining Co., St. Louis; the Western Coal and Mining Co., and Edward E. Riley, treasurer of the Central Coal and Coke Co., brought by Alexander Howat, president of District No. 14 of the United Mine Workers of America, went to trial in the circuit court of Kansas City on May 23.

Howat's suit was based on statements alleged to have been made by the plaintiffs that he, as the representative of the union miners of the Kansas district, was paid approximately $12,000 to influence him on a contract then pending between the miners and the Southwestern Interstate Coal Operators' Association, of which the defendants were officers. He asked $25,000 actual and $25,000 punitive damages.

Joseph H. Hazen Cannot Be Found Anywhere

It was announced at the opening of the trial that Joseph H. Hazen, chief witness for the defense, could not be found and probably was in Canada. Lawyers on both sides seemed not to know his whereabouts. The operators claim that Hazen, acting in their interests, paid a consideration to Alexander Howat to induce him to change union contracts, and consequently Howat's statements would be of vital importance to the defense. Most of the first day was spent in reading depositions of Charles Keith and A. E. Maxwell, president of the Pittsburgh Bank of Commerce, and in securing a jury to try the case.

The loving cup alleged to have been given to Hazen by Howat was introduced in the testimony. Howat denied that he ever gave Hazen a loving cup and said that he never saw it until the depositions were being taken last December. Howat occupied the witness stand an entire afternoon and most of that time was kept under a fire of questions by John H. Lucas, chief counsel for the defendants; but he stood the grilling well, apparently relying on the jury to accept his explanations as being correct.

The result of the trial was the awarding of $7,000 damages against Joseph H. Hazen, of Mulberry, Kan. The suit against Charles S. Keith was not successful.

It will be remembered that a conference was held in Kansas City on May 15 at which the mine workers and operators were expected to decide on a contract to replace the one which will expire on July 31. The operators refused to discuss a new contract so long as the expiring one was being broken.

It is reported that this trial was the real reason why an adjournment of the conference was proposed. The miners hoped that the suit would give Howat a chance to vindicate himself.

On June 2 there was another meeting which was adjourned sine die with the same allegation from the operators that it was useless to sign contracts if they were not kept. The operators have felt that the miners were not proper persons with whom to make a contract so long as they kept Alexander Howat in office, for that official was thought to be guilty of receiving bribes and was apparently afraid to go to the courts in his defense.

Now his character is cleared, and the difficulties regarding a conference may be removed. It is thought that John P. White will now take a hand in the settlement. Until the present, White has been bitterly opposed to Howat, holding that he should have cleared himself of the charges against him before running for office. In fact, Commissioner Johnson for the coal operators has asked White to assist in the negotiations. White will probably be in Kansas City June 22 to discuss the situation.

At one time it was expected that the mines would work without a contract after July 31, so impossible did it seem to arrange a meeting. The deadlock caused about 35,000 men to be idle.

Most of the trouble is in the State of Kansas, district No. 14, Alexander Howat's district. The operators refused to consider a settlement so long as their mines were kept idle illegally. But it is hard to decide whether the striking or the feeling against Howat was the more powerful cause of the refusal to discuss a scale. The strikes are certainly many and annoying and quite sufficient to justify the refusal of the company to continue negotiations.

Strike To Have All Work Available Divided

The Western Coal and Mining Co. and the Wier Coal Co. have, between them, 12 mines idle. The men are trying to compel these companies to work all their mines a part of the time instead of operating one mine or more all the time. The mines of the Besse Cockrell Coal Co. are closed because of a dispute over a discharge case; No. 49 mine of the Central Coal and Coke Co. is shut down because of a disagreement over the panel system. In all these cases, it is said, the mine workers have neglected to seek an adjustment under the terms provided in their contract.

Alexander D. Wales' Suit Against the United Mine Workers of America has been inactive so long that the public hardly expected to hear any more about it. It will be remembered that Wales claimed that it was due to his services that the great anthracite coal strike in 1902 was settled. He believed himself entitled to $200,000.

Some time ago Wales asked the court for permission to examine the records of the proceedings of the United Mine Workers, then in the possession of Albert S. Barnes, of Binghamton, N. Y. who on a court order deposited them with the county clerk that Wales might examine them. He appeared before Judge Sewall on June 13 and charged that the minutes of 1903 had been substituted for those of 1902 and that the court stenographer's mark of identification had been forged on them. A referee was appointed to examine his charges.

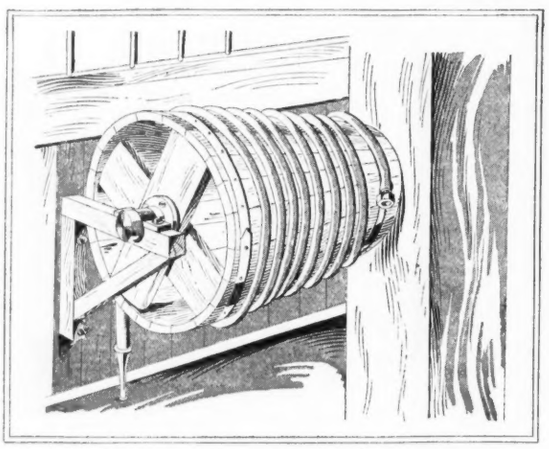
WAGE SCALES OF THE H. C. FRICK COKE CO. FROM THE LAST BIG STRIKE IN 1894 TO THE LAST ADVANCE EFFECTIVE MAY 8, 1916

(The rates paid by the H. C. Frick Co. are closely followed by most of the operators in the Connellsville coke region)

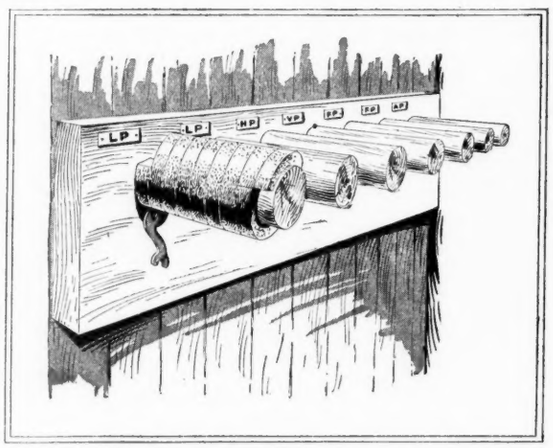
Class of Work	Feb. 10 1894	Apr. 1 1895	Oct. 1 1895	Jan. 1 1896	Apr. 29 1899	Mar. 1 1900	Jan. 1 1903	Dec. 16 1903	Mar. 1 1905	Mar. 1 1907	Jan. 1 1908	Jan. 16 1910	Apr. 1 1912	Feb. 1 1916	May 8 1916
Mining and loading room and rib coal, 100 bu.	$0.78	$0.90	$0.954	$1.05	$1.12½	$1.25	$1.35	$1.10	$1.20	$1.35	$1.20	$1.55	$1.44	$1.58	$1.66
Mining and loading wet heading coal, 100 bu.	.88	1.02	1.08	1.20	1.27½	1.40	1.50	1.25	1.37	1.50	1.38	1.50	1.58	1.73	1.85
Mining and loading wet heading coal, 100 bu.	.95	1.10	1.166	1.25	1.31¼	1.45	1.55	1.30	1.45	1.60	1.50	1.62	1.70	1.86	2.00
Drawing coke, per 100 bu. charged	.43	.50	.53	.60	.64	.72	.77	.63	.70	.77	.70	78	.82	.90	.95
Leveling, per oven	.08	.09	.095	.104	.10½	.12	.12¾	.10¾	.11½	...	.11½	.12½	.13¼	.14¾	.15
Drivers, rope riders, in shafts and slopes, per day	1.65	1.84	1.95	2.05	2.12½	2.35	2.50	2.20	2.40	2.55	2.40	2.60	2.85	3.05	3.20
Drivers, rope riders, in drifts, per full run	1.60	1.75	1.855	1.95	2.02½	2.25	2.40	2.10	2.30	2.45	2.30	2.55	2.80	3.00	3.15
Cagers, per full run	1.65	1.84	1.95	2.05	2.12½	2.35	2.50	2.20	2.40	2.55	2.40	2.60	2.85	3.05	3.20
Tracklayers, blasters and timbermen, in shafts and slopes, per day	1.65	1.84	1.95	2.05	2.12½	2.35	2.50	2.20	2.40	2.55	2.40	2.60	2.85	3.05	3.20
Tracklayers, blasters and timbermen in drifts, per day	1.60	1.75	1.855	1.95	2.02½	2.25	2.40	2.10	2.30	2.45	2.30	2.55	2.80	3.00	3.15
Assistant tracklayers and inside laborers, per day	1.35	1.50	1.59	1.65	1.72½	1.87½	1.97½	1.65	1.75	1.95	1.75	2.00	2.15	2.30	2.40
Dumpers and tipplemen, per full run	1.35	1.50	1.59	1.68	1.75½	1.90½	2.00½	1.68	1.80	1.95	1.80	2.00	2.15	2.30	2.40
Chargers, per oven	.03	.03½	.037	.04	.04¼	.04½	.05	.04	.04½	.04½	.04½	.04½	...	...	...
Chargers, per day	1.40	1.50	1.59	1.68	1.75½	1.90½	2.00½	1.75	1.85	2.00	1.85	2.00	2.15	2.30	2.40
Forking cars, 40,000 lb.	.85	1.10	1.166	1.25	1.35	1.50	1.65	1.40	1.50	1.65	1.50	1.65	1.75	1.90	2.00
Forking cars, 50,000 lb. to 60,000 lb.	.95	1.25	1.325	1.40	1.50	1.65	1.80	1.50	1.60	1.75	1.60	1.75	1.85	2.10	2.10
Forking cars, over 60,000 lb.	.75	1.00	1.06	1.25	1.35	1.50	1.65	1.60	1.75	1.90	1.75	1.90	2.00	2.15	2.25

Firebosses' wages on Feb. 1, 1916, were made $3.75 and on May 8 were raised to $3.90.

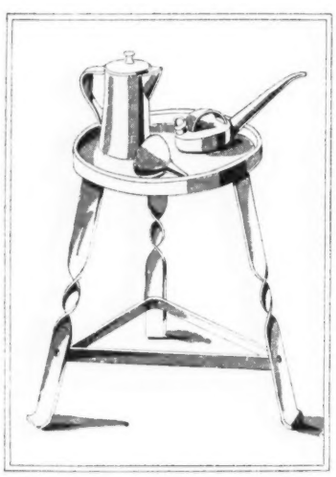
Handy Hints and Clever



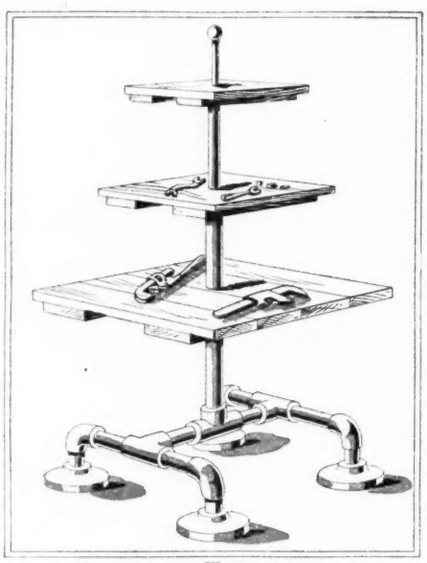
A Home-Made Hose Rack



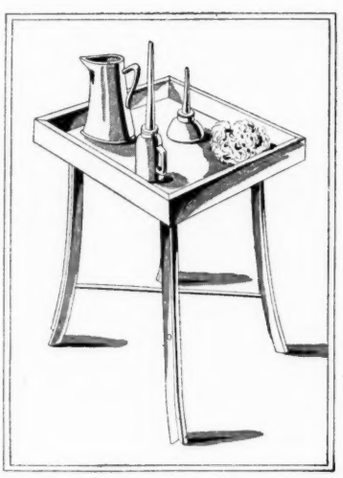
Handy Rod-Packing Rack



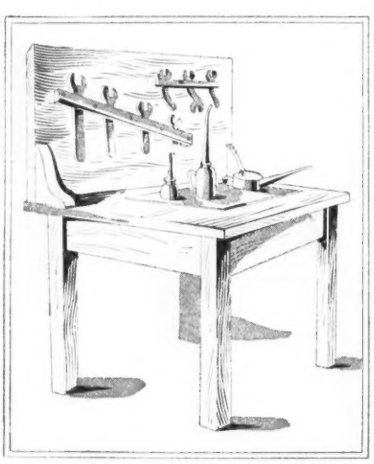
Oil-Can Stand



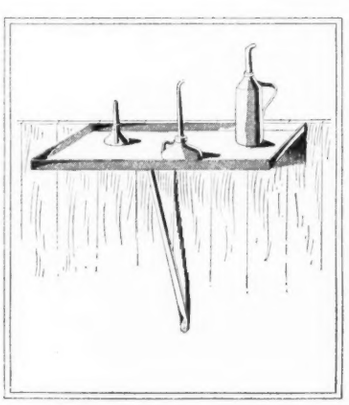
Portable Tool Stand



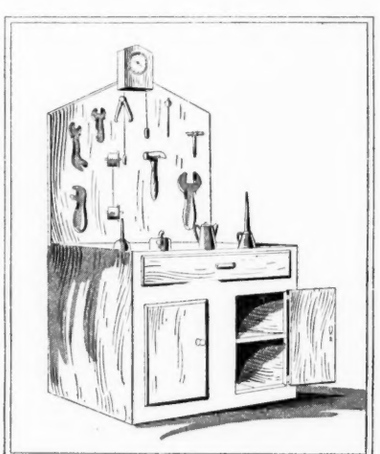
Oil-Can Table



Combination Table and Wrench Board



A Convenient Shelf for Oil Cans

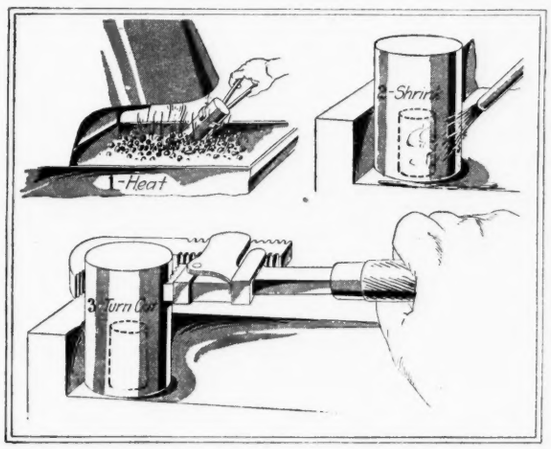


ORMAY PROCESS, PATENTED APRIL 18, 1916

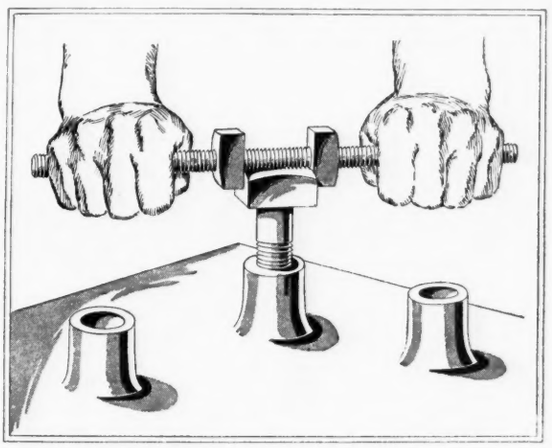
A Useful Engine-Room Cabinet

Engine-Room Furniture That is Easily Made

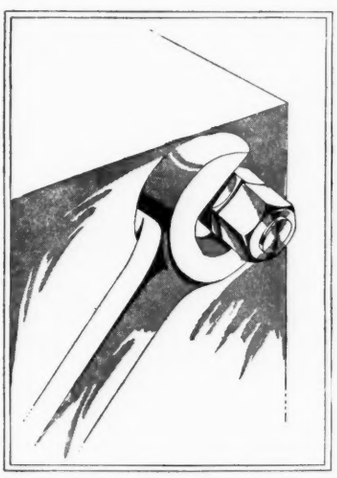
Kinks for the Power Plant



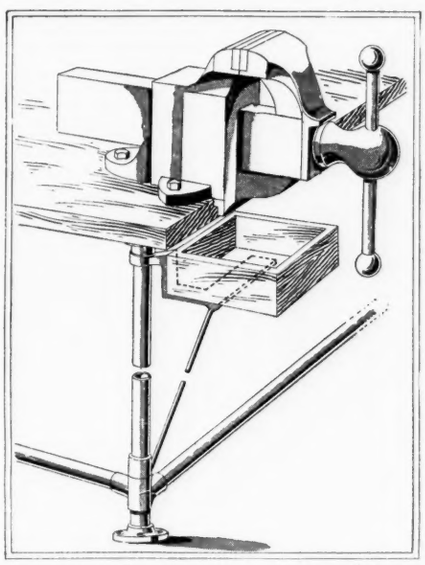
Getting a Grip on Tightly Driven Pin



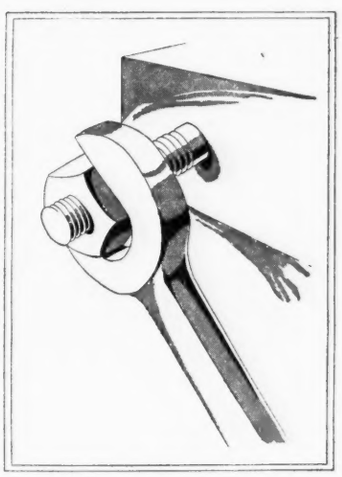
A Quickly Made Emergency Wrench



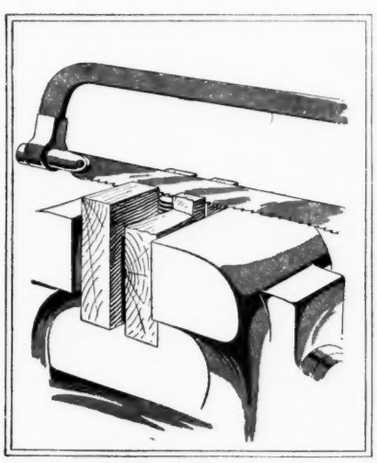
Pulling a Stud with Locknuts



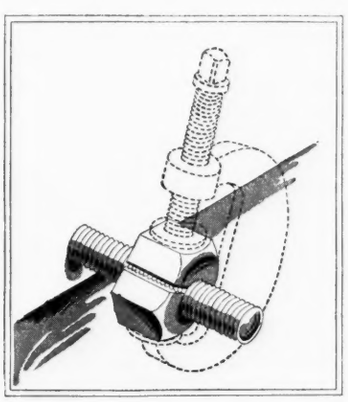
Swinging Drawer for Small Tools



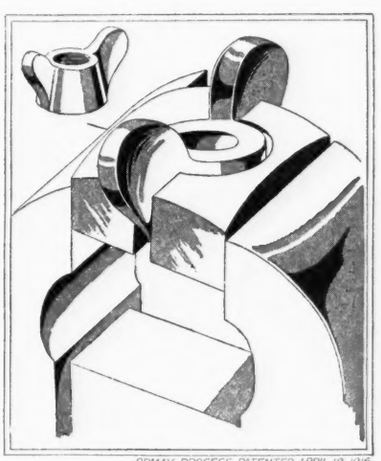
Pulling Stud with a Shrunk Nut



Holding a Screw for Slotting



Pulling a Stud with a Split Nut



Wing Nut Held by Split Nut

Some Stunts That Work Out In Practice

"Power," June 20, 1916

Editorials

Our Wasted Wealth in Pyrite

In 1915, according to the preliminary reports of the United States Geological Survey, we produced 518,000,000 tons of coal. Let us suppose that it contained from 2 to 3 per cent. of sulphur as an average, including in that quantity not only what is shipped to market as coal, but what is left at the mine or underground in unsightly piles.

It will be somewhat of a surprise that under these circumstances the sulphur thus mined in coal mines every year and largely wasted amounts to between 10,360,000 and 15,540,000 short tons. As most of this is in the form of pyrite and marcasite, FeS_2, the quantity of these minerals extracted must approximate 19,422,000 to 29,133,000 short tons. Of course these huge figures would grievously over-represent the amount of *recoverable* pyrite, but they do suggest what a large part is being used only for its value as fuel, how much sulphur dioxide is being produced solely to the discomfiture of mankind and what a large quantity of sulphur there must be in our rock dumps and bone piles.

Pyrite is at best poor fuel both in its heat-giving qualities and in its effects on the grates. It would be well if some means were found of using such a large product in some more desirable way.

There is of course only a limited demand for this substance, but in 1914 1,149,811 short tons of iron pyrite were imported into this country and 29,271 tons of sulphur equivalent to 54,876 tons of pyrite, or a total of 1,204,687 tons.

To this may be added the production of pyrite in the United States in 1914, to wit. 377,061 short tons and the production of sulphur 366,950 short tons equivalent to 687,945 tons of pyrite, bringing the whole capacity of the United States for pyrite in domestic use and export up to 2,269,693 short tons—barely 10 per cent. of the whole used and unused product of pyrite in the coal mines of the country. Of course most of the sulphur imported and all the domestic sulphur here listed is not from pyritic sources, but much of it might be replaced, if not now at least after awhile, with sulphur of that origin.

Some of this pyrite did come from coal workings. Illinois produced from that source, 25,243 short tons; Indiana, 1,915 tons; Ohio, 8,152 tons, or 35,310 tons in all. Thus the used output of the coal mines was in 1914 only 9.4 per cent. of the used output of the United States and but 1.6 per cent. of the whole amount of pyrite needed to supply the country's needs for use and export. In these figures are overlooked, of course, the sulphuric acid production at copper and zinc smelters, which is quite important.

There would therefore be a great opportunity before the coal-mining public were the prices for pyrite higher. Pyrite could profitably be sold at a few cents per ton if only the purchasers did not object so strongly to the coal skin with which most pyrite is accompanied. The removal of this coal, which does not, it is true, need to be done with any marvelous perfection, is slow and expensive by hand methods. With the proper machinery it should be possible to reach the price the purchaser is ready to pay, which was in 1914 per short ton, in Indiana $2.76, in Ohio $2.42, and in Illinois $2.34, an average for the three states of $2.38.

Either because of the poor condition of the pyrite from the coal mines or of the competition among pyrite producers, the price paid in Virginia, the principal pyrite-producing state in the Union, is higher than in states where the product comes from coal mines. In 1914 that state produced 158,229 short tons at $3.51 per ton. The whole output of the United States had an average value of $3.40 per short ton.

From these figures it is clear that if the proper steps were taken, the pyrite industry might be quite profitable, and it is surprising that the Bureau of Mines has done nothing to bring this byproduct of mining before the public.

Sulphur is used directly or indirectly either as an element or in combination with other elements in the manufacture of most chemicals and in the production of synthetic dyes, kerosene, explosives, sugar, starch, breakfast and other foods, textiles and fabrics of many kinds, paper, rubber goods, fertilizers and fungicides. In looking around to ascertain the means whereby the United States can be made self-contained, the large bodies of pyrite in coal should not be overlooked. But first of all for most of us it is necessary to discover how it can best be prepared for market.

It may be added that these figures, which are based on those in the report of the United States Geological Survey on Mineral Resources for 1914 exclude consideration of all imported pyrites containing over 3½ per cent. of copper.

Advantage of Buying Next Winter's Fuel Now

We are frequently asked to formulate a few ideas to be used to induce consumers to lay in their winter's supply of coal in the summertime. The subject is a pertinent one and of such general interest that we believe it worth while to present briefly the chief arguments in favor of it.

In the first place, the price of coal is normally the lowest in April, gradually increasing until the maximum is reached in September. The reduction this year, as is well known, did not take place until late in May.

Another important factor, although one not generally known, is the question of quality. Anthracite requires an extensive, and at the same time expensive, preparation. Numerous boys are employed to pick slate, and large quantities of water are used in washing the coal. With the thermometer hovering near the zero point, it is obvious that fingers are not so nimble in picking impurities from the coal, while the water often freezes so badly as to make its work almost ineffective. In addition to this,

the demand for fuel is so heavy in winter that the mines are rushed to fill orders and the preparation is necessarily slighted in the endeavor to meet this maximum demand.

Another consideration is the easier delivery in summer as compared with winter, on the part of both the railroads and the retail man. When ice and snow come, there are always long delays, together with accidents to men and equipment.

It is a peculiar freak of human nature that many persons never think of their coal bins until a snowstorm arrives. Any retailer in the northern latitudes can cite incidents by the score of the insistent ringing of the telephone ordering coal on a snowy day; more orders frequently come in during a single hour, with the request to be filled "today," than can be handled in an entire week.

These arguments are applicable to any normal year, and in addition there is a special one for the present season. There is an absolute dearth of labor in the coal region today. For months past miners have been leaving, sometimes entire carloads of them, to take positions in industrial plants where the wages seem higher and the work more congenial. At this very time representatives of the munition plants are stationed in the coal regions seeking labor. In fact, conditions have become such that with hardly a normal demand for fuel, the mines are unable to fill the current orders promptly.

This situation is further accentuated by the independence of the miners. Although their officials have just concluded a new working agreement in which they received eminently fair conditions, still they they are not satisfied. They are so inclined to quibble over the application of the terms of the agreement that frequently as many as twenty mines are closed by these so-called local strikes.

To some the real difficulty with the miners seems to be that they have money to spend and are only looking for a pretext to make an opportunity to spend it. The seriousness of this situation lies in the fact that as fall approaches, the difficulties in working the mines at anywhere near their full capacity will be such as to cause an actual shortage of coal when cold weather appears.

The Peak of the Advance in Ocean Freights?

A significant pause in the persistent increase in ocean freight rates is noted, which may indicate that the crest of the rise has been touched. For more than a year new high quotations have been recorded week after week with monotonous regularity. The present halt will therefore be viewed with an active interest by coal exporters, since it is not at all unlikely that it may mark the peak of the advance.

A year ago the ocean freight rate to Montevideo was $8.60, which compares with $19.20 at the present time; to the west coast of Italy the rate was $9.60, as compared with $31.20 today. While the advance in rates to both of these points has been marked with moderate fluctuations, on the whole it has been of a very consistent nature. A slight irregularity is noted in the Italian rates about the middle of 1915, quotations experiencing a sharp jump from the $9.60 figure of May 15 to $10.80 on May 22, from which maximum they slowly reacted during June and July, touching a minimum of $8.64 on July 24.

Since that time, however, the rates have experienced an almost uninterrupted increase with each week's quotations, touching $15.60 by the end of October, $19.20 in November, $22.80 in December and establishing a new high record of $29.50 at the close of January. Following this the rates reacted slightly, touching $27.60 on Feb. 5 and $26.40 on the succeeding week, Feb. 12, but after marking time at this level for three weeks until Feb. 26, another gradual advance occurred culminating at the new high-record level of $33.60 on Apr. 22.

For the succeeding two months this maximum rate has been maintained with the greatest difficulty, even being shaded two or three weeks during this time. At no time during the spectacular advance did the rates remain stationary for such periods as in recent weeks. Increases took place nearly every week or at the very outside every three weeks.

The accompanying table shows the progressive increase in ocean freight rates to two principal destinations—the west coast of Italy and Montevideo.

1915		West Coast Italy	Montevideo	1916		West Coast Italy	Montevideo
Oct.	23	$14.40	$8.88	Feb.	19	$26.40	$16.80
	30	15.60	9.60		26	26.40	18.00
Nov.	6	15.60	9.60	Mar.	4	27.60	21.60
	13	16.80	10.80		11	27.60	22.80
	20	16.80	10.80		18	27.60	24.00
	27	19.20	12.00		25	28.80	24.60
Dec.	4	21.60	12.00	Apr.	1	28.80	25.20
	11	21.60	12.00		8	31.20	24.00
	18	22.60	12.60		15	31.20	22.80
	25	22.80	12.60		22	33.60	21.60
1916					29	31.20	20.40
Jan.	1	22.80	12.60	May	6	31.20	20.40
	8	25.20	13.00		13	31.20	20.40
	15	25.20	13.00		20	33.60	20.40
	22	29.50	13.50		27	33.60	20.40
	29	29.50	14.40	June	3	33.60	20.40
Feb.	5	27.60	15.00		10	33.60	20.40
	12	26.40	15.60		17	31.20	19.20

What Our Forefathers Knew

The decline of the merchant marine has made most of us a little hazy as to the real conditions under which ocean transportation is carried on. This was probably by no means so evident in earlier years, when more people lived or had lived on the seaboard, had engaged in shipping in the deep waters and knew the conditions with which seafaring men and exporters are confronted.

A correspondent of the "Journal," of the Franklin Institute in 1836—he does not give his name—writes about the prospect of mining coal from the Mount Carbon mines on the Big Muddy River, near Brownsville, Jackson County, Illinois:

> There would, besides, if this coal were in the market, be a large demand for the outward-bound shipping from that port (New Orleans), and as ballast for those in the Havana and South American trade, indeed, the demand may be considered almost unlimited.

It is interesting to notice that it is well recognized that coal can make the longer trips only as ballast. It is not transportable for long distances like manufactured articles, wheat, hides and other merchandise unless a more valuable cargo is to be returned.

It is not necessary to imagine a conspiracy to explain our failure in shipping coal to European and some American ports. Our brusque business methods, our short-time credit, our lack of financial interest in the countries to which we export, our need of banking facilities, our ignorance of the language, our failure to prepare our coal with pharisaic perfection—these are mere items in comparison with the fact that the addition of coal to our shipments would still further unbalance the trade we are doing and make our exported merchandise still more disproportionately large in its tonnage, bulk and value.

Department of Human Interest

First-Aid Day at Gillespie

SPECIAL CORRESPONDENCE

SYNOPSIS—The Superior Coal Co., with the local union at Gillespie, Ill., holds its annual contests with boys and ladies, as well as mine workers, as contestants. The wording of the events is only partly medical, the intention being to exhibit not only the injury, but the carelessness or misfortune that made the first-aid work necessary.

The Superior Coal Co. held its Fourth Annual First-Aid Meet at Gillespie, Ill., on Saturday, May 20, 1916. The surprise of the day was to find that the old bandstand in the park had been removed on the day preceding and that a new and larger one had been erected on concrete foundations previously constructed. The transformation was so rapid that the local residents of Gillespie stood in surprise and wondered how the old structure that they had seen but a day before had been so quickly replaced. The new stand had been painted red and white and was fittingly decorated with bunting. The town of Gillespie responded as usual, and all the merchants and citizens had decorated the village for this, the leading event of the year.

The out-of-town guests arrived early in the morning, and the program was started early, with music by the Gillespie Concert Band, followed by an address of welcome by Mayor Behrens. J. P. Reese, the president of the Superior Coal Co., responded, setting forth why his company spent so much thought and energy on first aid and safety first.

Mr. Reese was followed by Frank Farrington, state president of the United Mine Workers of America, who emphasized that it was desirable that everyone working around the mines learn first aid. The manner and matter of his speech were both exceedingly impressive, and no one could doubt that his advocacy of the practice of first aid by union men was as sincere as it was ably expressed.

John P. White, international president of the United Mine Workers of America, who was scheduled to speak, wired at the last moment that he regretted that, owing to unforeseen circumstances, he could not attend. After the addresses the morning contests were held.

The arrangements for the meet were under the direction of Thomas Ellis, chairman, John Young, James Boston, Alex Coates, John Clarkson and James Greer, secretary. The teams competing at the Gillespie meet are to be congratulated on having the following able judges to select the prize winners: Dr. August F. Knoefel, chief surgeon, Indiana Operators' Association and consulting surgeon of the United States Bureau of Mines; Doctor Green, of the American Red Cross; Dr. F. A. Renner, Benld, Ill.; Dr. Charles D. King, Gillespie; Dr. E. R. VanMeter, Staunton; Dr. J. N. English, Gillespie; Dr. R. H. Bell, Carlinville; Dr. J. R. Higgins, Gillespie; Dr. Hazel, Staunton; Dr. L. O. Vogt, Gillespie.

A special prize was offered to the team that best observed mining conditions. Judges were appointed of long experience in rescue and first-aid work to adjudicate the excellence of the work from this viewpoint. They were: J. E. Anderson, inspector, Farmington, Ill.; Thomas English, superintendent Springfield Rescue Station; Alex Jones, superintendent LaSalle Rescue Station; James Towal, superintendent Benton Rescue Station.

The record of the events was kept by Howard I. Smith, United States Bureau of Mines, and F. F. Jorgensen, chief engineer of the Superior Coal Co. The recording was systematically done, and there was no loss of time between events nor waiting to determine the ties. As soon as one event was completed the cards were sent out for the next event, and the teams immediately started work on the next problem.

The entertainment committee consisted of Mayor A. H. Behrens, Joe Long, H. F. Bycroft, Sr., D. C. Burroughs, Elmer Stehlin, A. C. Isaacs and D. D. Wilcox.

First-Aid Problems Include Safety Lesson

All the problems given in the first-aid meet were designed to teach a safety lesson to remind the contestants how accidents may occur and to acquaint the spectators with the nature of the accidents to which miners are exposed.

The problem for the local team, which had never competed in a first-aid meet, and for the boys' and girls' teams, was as follows: Compound fracture of right arm 6 in. above elbow; active hemorrhage; laceration of top of scalp; left foot crushed, practically no bleeding. This contest was held in the morning, and because of the lack of time only one problem was given.

At two o'clock in the afternoon the teams were lined up ready for the competition. As the award was given for an average of the three problems presented, the gross number of discounts possible was increased and as a result there were no ties to be worked off. The problems with safety lessons were as follows:

Event 1—A loader fails to set a prop that had been knocked out by a shot the night before; while loading his car he is caught by a fall of slate, sustaining the following injuries: Compound fracture of right thigh in middle third, bright-red blood; middle-front fracture of lower jaw. Victim is in a state of severe shock.

Event 2—A machine runner pulls his machine cable across the trolley wire to the feeder wire on the other side of the roadway. In doing this he pulls the trolley wire down, which falls on the right side of his neck, causing a burn and rendering him unconscious. Rescue the victim and treat his injuries.

GIRLS' AND BOYS' TEAMS LINED UP AFTER CONTEST, WITH JUDGES BEHIND THEIR RESPECTIVE TEAMS
In the center—Dr. A. F. Knoefel with the key, and J. P. Reese, the president of the Superior Coal Co.

Event 3—A shotfirer lights shots in a room, then goes into one adjacent; while in there one of the shots breaks through rib, knocking some props out. He is struck by coal falling from rib, sustaining the following injuries: Severe lacerations of left arm about 4 in. above the elbow with active hemorrhage; simple fracture of right leg about 6 in. above the ankle.

Immediately following the team contest, the one-man event was started with 28 entries. The problems with safety lessons were as follows:

Event 1—A machine cuts through into old workings which had been sealed off; coal from the face falls on the helper. His left foot is crushed and he is rendered unconscious by the gas from old workings.

Event 2—A driver wearing gauntlet gloves jumps off a car to sprag the wheels; the cuff of his glove catches on the corner of the car, causing him to stumble and fall under the wheels. In this manner he fractures the eighth, ninth and tenth ribs on the right side.

Event No. 3—A motor jumps the track, knocking out the leg of a timber set. The crossbar falls on the trip rider and loose slate is left hanging. The victim suffers from a dislocation of the right shoulder.

Immediately following the working of these three problems, a mine-rescue demonstration was presented in an improvised mine. The rescue team consisted of Gaven Mauchlin, captain, James Ervine, Alex. Russell, John Young, Robert Russell, Robert Cross, James Struthers, Sam Trainor, James Easton and John Cowden, patient. The first-aid miners were Robert Weir and Charles Miller.

The demonstration took place in a mine, the entrance of which was covered with canvas. The main entry extended 100 ft. east to a stub-entry going north. Rooms 1 and 2 were being driven west off of the stub-entry. While the shotfirer was working, an explosion occurred. The sound of a gong summoned the rescue team, which, before starting operations, examined the map of the mine. Five of them entered the workings and found the shotfirer in room No. 1 and signaled by means of the life line for a stretcher. They found a fire in room No. 2 and signaled for fire extinguishers. On their way back to the entrance of the mine they discovered a fall in the entry. They signaled for assistance, and two men entered the mine and cleaned the fall, after which the entire party returned to the drift mouth.

There being many ties among the contestants in the one-man contest, all those so tied were required to put on a dressing for a lacerated scalp. In this event the men who were tied for any one place were all judged by one doctor, and no grade was given except "plus" or "minus." The team that performed the best work was given a "plus" to the grade already received on the previous problem, and the other team a "minus." Where three men were tied, the lowest team was given a double "minus."

In the evening a session was held in the Colonial Theater, with Barney Flaherty, of local union No. 2719, United Mine Workers of America, presiding. The Gillespie Concert Band gave several selections of high-class music, which were intermingled with talks by mining men and others.

Addresses on Safety and the Company's Record

Dr. A. F. Knoefel then addressed the crowded theater on the value of first aid and who should study it. He said that when anyone was hurt in an automobile wreck or underground, the first man present always rendered first aid of some kind, good or bad. He therefore urged all the men present to learn the proper methods of giving aid, so that they would really help the injured and not increase his injuries.

Motion pictures illustrating safety methods in mines were exhibited by the Bureau of Mines, and David Ross, the ex-secretary of the Bureau of Labor Statistics, made an address containing many illuminating figures. Among other matters he showed that the Superior Coal Co. produced coal with 1.1 fatalities per million tons, with a loss per annum of 1.3 men per thousand employed and a tonnage of 885,177 tons per fatality. This is a record so good that if every mine did as well, the fatality loss per annum in the coal mines of the United States would be reduced by 1,800 victims a year.

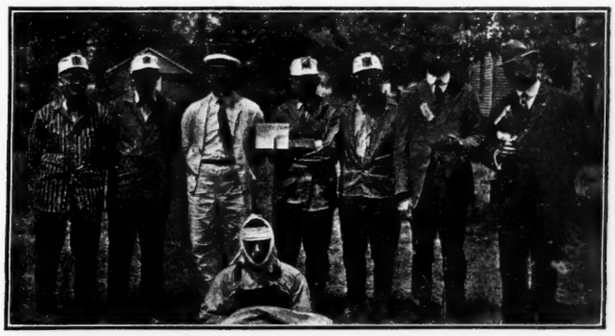
In the boys' contest the first prize went to the Superior Coal Co. No. 1 team, John Shanahan, captain; the second prize fell to Superior Coal Co. No. 2 team, Pat O'Neal, captain.

In the girls' contest, Superior Coal Co. No. 1 team, with Clara June Brown as captain, took first prize. The second prize was awarded to Superior Coal Co. No. 2 team, Beulah Shafer, captain.

In the home-team contest there was only one contestant, the Superior Coal Co. Ivory Tops with Charles Miller, captain.

In the team contest the first prize, consisting of the American Red Cross medals, the gold medals of the Superior Coal Co. and $60 in cash, was won by the Superior Coal Co. No. 1 team, with James Struthers, captain, John Cowden, Charles Miller and Robert Weir, assistants, and Pete McKee, patient. The second prize was won by B. & E., Local No. 707, Peoria, with T. B. Trigg, captain. The prize consisted of silver medals, presented by the Superior Coal Co., and $25 in cash.

The third prize was won by the Gillespie First-Aid No. 2 team, with Guy Mauchlin, captain. The fourth prize fell to the Gillespie First-Aid No. 1 team, with James Easton, captain. The other winners in order were: (5) Big Muddy Coal and Iron Co. No. 7 mine team, Herrin; (6) Christopher team; (7) Shoal Creek Coal Co. team, Panama; (8) West Frankfort First-Aid Association team; (9) La Salle team. A special prize of



THE GILLESPIE "IVORY TOPS," WHO COMPETED FOR THE FIRST TIME

$15 was given to the team making the highest score in the taking of due precautions for safety under the mining conditions outlined in the problem. This was awarded to the La Salle team, with Walter Kemery, captain.

The one-man contest was won by James Struthers, of Gillespie, William Fulton obtaining second prize. The winner got an American Red Cross medal, $25 in cash from Local No. 730 of Mine No. 1 and a gold medal from the Superior Coal Co. To the second man was given $15 in cash, also from Local No. 730, and a silver medal presented by the Superior Coal Co. The local union also gave $10 in cash to the third man, Robert Cross, of Gillespie. All the contestants were given prizes in recognition of their merit, the value of these prizes being graduated to fit the order of their excellence.

Alabama First-Aid Contest

By H. S. Geismer*

SYNOPSIS—The judges at this meet were all medical men, but some of them were apparently not students of first aid. Only one-half of those appointed were actually on hand to serve. The ladies' teams made an excellent showing.

The second state-wide first-aid contest held in Alabama under the auspices of the Alabama Safety Association, was staged in Birmingham, May 27, 1916. Had the weather man been just a little more generous with his degrees of temperature, some sure enough first-aid work would have been in demand during the day. Even as it was, the thermometer stood at exactly 94, which was higher by several degrees than any other record for the year. To make matters even worse, the teams assembled promptly at 1 p.m. and then were kept in the broiling sun until 1:30 p.m., awaiting the arrival of most of the doctors who were to act as judges. About the last judge to appear on the scene was the chief judge of the day.

While on the subject of doctors, it must be said in all justice to the profession that the success of the meet and, in fact, the success of the entire first-aid movement in Alabama is in a large measure due to the untiring efforts of Dr. W. S. Roundtree, physician of the Tennessee Coal, Iron and Railroad Co. and an active worker in the American Red Cross.

Fifty-seven teams were entered for the contest, but a few of them failed to appear. There were 2 teams composed of ladies, 29 teams of white men and 13 of colored men in the competition. The scores of the winning teams were all higher than the corresponding scores at last year's meet. The prizes and their winners were as follows:

1. White men's team—First prize, silver loving cup, won by Alabama Fuel and Iron Co. team from the Acmar mine;

*Birmingham, Ala.

EVERYBODY PRESENT BUT THE DOCTORS

WINNERS OF LAST YEAR'S LOVING CUP

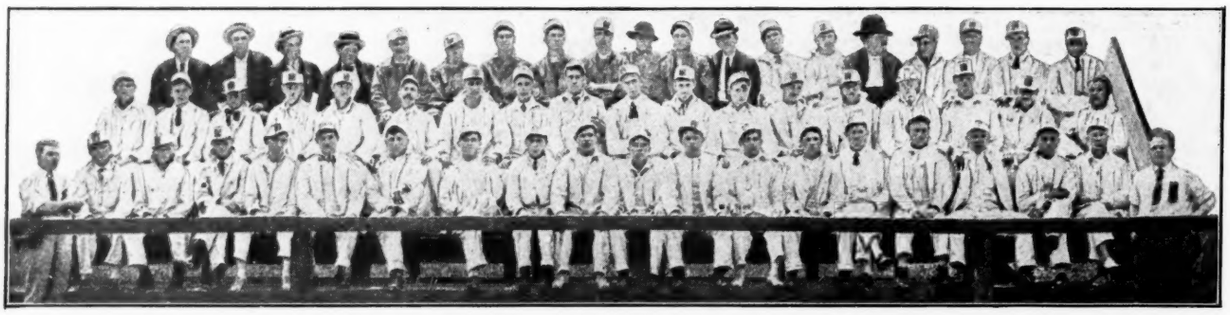
second prize, $7.50 in cash for each member of the team, won by the Gulf States Steel Co. team from Altoona; third prize, $5 in cash for each member of the team, won by the Sloss-Sheffield Steel and Iron Co. teams from Maben and Cardiff. Rather than have the prizes divided between these two teams on account of the tied score, the officials of the latter company contributed an extra $25, so that each member of the two teams received $5 in cash. The highest score in this event was 97⅞, the second highest 97¼, and the third was 96⅜.

2. Ladies' Team—First prize, silver loving cup, won for second time by a volunteer team from Wylam, Ala.; second prize, $7.50 in cash to each member of the team, won by ladies from Palos, Ala.

3. Colored Men's Team—First prize, silver loving cup, won by the Alabama Fuel and Iron Co. team from Acmar, Ala.; second prize, $7.50 in cash for each member of the team, won by the Republic Iron and Steel Co. team from Sayreton, Ala.; third prize, $5 in cash for each team member, won by the team of the Republic Iron and Steel Co. from Republic, Ala. The highest score in this event was 97⅞, the second highest was 97¼, and the third highest, 96⅜.

The prizes were awarded by James L. Davidson, president of the Alabama Safety Association. Mr. Davidson had worked untiringly for the success of the meet, and it seemed fitting that he be given opportunity to get a little glory out of the proceedings. Had it been known in advance that so large a proportion of the audience were to be ladies, it is more than possible that Mr. Davidson would have had competition for the assignment.

The rules governing the contest and the penalties imposed were the same as used at last year's meet; they have also been used at most of the meetings held throughout the United States during the past year. Judging by the results obtained at the two Alabama meetings, they are entirely satisfactory.



LINE UP OF THE TEAMS FROM THE MANY MINES OF THE SLOSS-SHEFFIELD STEEL AND IRON CO.

As was the case at last year's meet, the doctors received some criticism, and such criticism will probably always be merited until the medical profession takes more interest in first-aid work. The fact that only half the number of the judges appointed actually reported for duty is evidence that the profession as a whole has not become enthused over the movement

Entertainment during the intermissions was furnished by three bands; the bandsmen, all of them miners by the way, seemed glad of the opportunity to display their talents; at any rate, unlike the judges, they were on hand early and remained late, and they kept everlastingly at it.

LADIES FROM WYLAM DID THE BEST WORK

PALOS LADIES TOOK SECOND PRIZE

Discussion by Readers

Siphon Line in a Mine

Letter No. 1—I read with much interest the inquiry of John Bednar, *Coal Age,* May 13, p. 858, and will not attempt to give any figures on the possible flow of water in his siphon, since this matter has been fully answered in the reply made to that inquiry on the same page. However, since Mr. Bednar writes as though his siphon was not yet in operation, I thought a few practical hints on the installation of the pipe line would be useful. The suggestions I offer are the result of my own practical experience in the operation of siphons in the mine. They are as follows:

There should be a good foot valve at the upper end of the pipe so as to prevent the water from running out of that leg of the siphon when the pipe is being filled. There should also be a good gate valve at the lower end of the pipe to shut off or regulate the flow of water in the pipe line according to need, and there should be a tee in the highest point of the pipe, for filling the line with water when starting the siphon. I have found it convenient to couple a cistern pump to this tee for the purpose of exhausting the air that collects from time to time in the pipe at this point. It is necessary, however, to keep a barrel of water here to prime the pump, as it will not exhaust the air unless the plunger and valves are submerged in water.

It is very important in laying the pipe line to make all the joints air-tight, using white lead or oil and graphite on the threads for this purpose. The pipe line should be laid to as uniform a grade as possible so as to avoid the accumulation of air at the high spots in the line. I have also found it of great advantage to have an ell turned upward at the lower end of the pipe. This forms a trap that prevents air from getting into the pipe at this end, and the water flows more evenly over the top of the ell. I hope these suggestions will be of some value.

Smithton, Penn. S. K.

Mine-Car Wheels

Letter No. 1—Permit me to comment briefly on the short article by C. W. Crawford, entitled "Mine-Car Wheels," which appeared in *Coal Age,* May 20, p. 872.

Our company has been manufacturing mine-car wheels for the last forty years, and we are in the same position as the railroad companies with respect to flanges. Mr. Crawford is surely aware of the fact that most modern mines are now equipped with the same style of frogs and switches that are used in railroad work, and that these frogs and switches have a certain amount of opening to give the necessary clearance to the guard rails. The railroads are practically limited to a flange of 1⅜ in. wide and 1¼ in. high, while mine-car-wheel manufacturers are limited to about 1⅛ in. thickness of flange and 1⅛ in. in height. We make some few flanges 1¼ in. high. One can readily see that the clearance depends mainly on the wheels themselves, and if a higher flange was used, there would probably result more derailment at frogs and switches on that account.

Another objection is that the higher flanges would be more liable to chip or break unless they were made considerably thicker at the base and given the same taper as they now have to the top. The contour of the inside of a flange where it bears against the rail is very important and has been worked out very carefully by railroad companies. We form our flanges to the standard railroad type, only reducing the dimensions in equal proportion.

It is not my wish to start a controversy over this proposition, but it would be interesting to know what position Mr. Crawford holds. The unevenness of the track that he mentions is no argument for the changing of the flanges. Mine tracks should be properly laid and not only would accidents from derailments be prevented, but the cars and the general equipment would be much benefited and the whole efficiency of the mine increased. A number of people seem to forget that the track and cars are as vital a part of the mine equipment as any other item. This argument could well be continued, but I would like to hear from others.

N. D. Hockensmith,
Vice-Pres. and Gen. Mgr.,
Hockensmith Wheel and Mine Car Co.
Penn Station, Penn.

The Efficient Fireboss

Letter No. 14—In the numerous letters that have appeared in *Coal Age* on the subject of what constitutes an efficient fireboss, I notice that more than two-thirds of the writers refer to the class of work performed by the fireboss as being different from that of other mine workers, in respect to its danger and disagreeable features. In my opinion these references have nothing to do with the subject under discussion, since the same class of work falls to every fireboss, whether he is efficient or inefficient. Indeed, there are a great many disagreeable tasks connected with the daily routine of all coal-mining work, from the trapper at his door to the superintendent or general manager in his office.

Having gone through the mill myself, I speak from experience. It was my lot to serve as fireboss for more than five years on heavy pitching seams, where it was necessary to climb the manway while holding my safety lamp in my teeth or strapped about my neck so as to leave both hands free for climbing the pitch. Men who have had like experience will agree with me that firebossing in heavy pitching seams is far more dangerous in every respect and more laborious than performing the same work in flat or moderately pitching seams.

Characteristics of an Efficient Fireboss

Returning now to the point under discussion—the efficiency of the fireboss—I would say that the particular characteristics that constitute efficiency in that office are the following: First and most important is the experience a fireboss should possess as a miner. He can gain this

experience only by learning how to mine coal successfully under all conditions at the working face. Second, an efficient fireboss must have a thorough knowledge of the properties and behavior of the several mine gases and understand their action on the flame of the safety lamp and their effect on the human system. Physically, the efficient fireboss must have a robust constitution; he must be temperate in his habits so that he can always be depended upon in an emergency, which is liable to arise at any moment in coal-mining practice. He must be energetic, courageous, painstaking and conscientious in all of his work.

An efficient fireboss must be a student of mining conditions, both theoretical and practical; he must be thoroughly familiar with the mining laws and know the duties they impose on him in his official capacity. He must adhere strictly to the carrying out of those laws and seeing that the rules and regulations relating to safety in the mine are complied with by every man in his section. He must not fail to admonish men of unsafe or dangerous practices in mining work and warn them against any violation of mine laws and regulations. When making his rounds in the mine, he must be quick to observe both the condition of all working places he visits and the habits of the men in his charge and be able to give them any needed instructions in respect to their own safety and that of their fellow workmen. J. W. POWELL.

Madrid, N. M.

Letter No. 15—Speaking from an experience of several years as fireboss in a very gaseous mine, which has given me a close acquaintance with the duties and work and a knowledge of the responsibilities of that position, I can say that the distinctive qualifications of an efficient fireboss, as has already been stated, are experience, honesty, soberness, resourcefulness and industry. I would place particular emphasis on the last item named, since no lazy or indifferent miner can ever hope to make a competent and reliable fireboss.

While the duties and responsibilities of the fireboss are different, in many respects, from those of the mine foreman, they are not as numerous and diversified. The mining laws make the foreman responsible for the ventilation of the mine, which duty compels him to have a more intimate and practical knowledge of ventilation than is required of the fireboss; but the latter must have a thorough understanding of the principles of ventilation and a full knowledge of the nature and behavior of the gases found in mines and their effect on the human system. He must understand the safest method of handling the different mine gases so as to remove them from the mine with safety. He must understand the construction, use and handling of the safety lamp under all conditions.

"OLD FIREBOSS" AGAIN CRITICIZED

I am inclined to agree with Edward H. Coxe in his criticism of "Old Fireboss," and his conclusion, *Coal Age*, May 20, p. 895, that the fireboss in the performance of his duties does not take "any more chance than most other mine workers." I agree with him that it would be a very careless fireboss—in fact, one wholly incompetent to fill such a place—who would make an inspection of a gaseous mine with a lighted lamp on his head. The efficient fireboss having only a safety lamp, and knowing how to use it, would experience little danger of walking into a body of gas as suggested by "Old Fireboss." When traveling a heading, there would be no excuse for such an act, as he must be constantly on the lookout for such a possibility. Assuming that the mine is subject to sudden outbursts of gas, the fireboss is in no greater danger than other men employed in the mine.

Referring to the statement of "Old Fireboss" that there are a "large number of so-called firebosses who hold certificates and stand ready to take any place that may be vacated," I believe that there are not any more certificated so-called firebosses ready to take vacated places at a low figure than there are certificated miners ready to jump into a mine foreman's place at any price offered. In regard to the pay of firebosses, I do not claim to be posted in this respect at the present time; but during the time I served as fireboss, I received the same salary as the foreman and worked shorter hours than that official.

FOREMAN ALONE RESPONSIBLE FOR DAY'S RUN

Referring to the suggestion made in Letter No. 4, May 20, p. 893, in regard to the fireboss receiving no credit or bonus for a good day's run of the mine, it must be remembered that the fireboss fills a different position and is not burdened with the same responsibilities as the mine foreman. Truly, the fireboss, head trackman, timberman, or driver boss should receive compliments due them in their several capacities. But, if one of these should be complimented and rewarded for a good day's mine run, why should they not all be mentioned alike, since they all contribute their share in the work. It must be recognized that while the fireboss is a very essential man in a mine in his particular office, and likewise trackmen, timbermen and drivers in their several capacities, the foreman is the wheel that turns the entire machinery of the mine and he is the man that is held responsible for the day's run of the mine.

In closing, I want to say that, while the work of a fireboss in a gaseous mine is difficult, incurs many risks and imposes heavy responsibilities, to me it was always fascinating. One of the interesting features of the work is the opportunities it affords of listening with much amusement to many old-time miners who profess a greater knowledge of mine gases, gained from their experience and magnified by a vivid imagination, whereby the entire question of mine gases is invested with romance and fiction. When I first listened to these wonderful tales, I felt that in some occult way these old miners had gained a knowledge of mine gases that was far beyond the reach of young men at the present day. JOHN ROSE,

Dayton, Tenn. Former District Mine Inspector.

Success in First-Aid Work

Letter No. 5—I have been deeply interested in the letters recently published in *Coal Age*, having reference to the future success of first-aid work.

Some of the writers having expressed the opinion that first-aid contests should be judged by American Red Cross or Bureau of Mines representatives, permit me to draw attention to the fact that this method of judging the work of contestants as well as that of selecting unbiased first-aid men to act as judges has been tried in a number of instances but always with the same result. First-aid contests as at present conducted invariably leave a train of dissatisfaction, ill feeling and suspicion in their wake,

which unhappy result proves to the unprejudiced mind that first-aid work is not properly a subject for competitive drills.

It is generally known and admitted by first-aid men and instructors that the chief object sought in holding first-aid contests was to gain a desirable publicity for the movement, which has now been so widely advertised, however, that everyone connected with mining knows its purpose and what can be accomplished through this means. On the other hand, the disadvantages attending the holding of first-aid contests are so numerous and far-reaching as to overshadow the advantages to be derived by such contests. The only practical way of determining the superiority of one first-aid man or team over another is by comparing the actual work done.

It has long been held by a number of first-aid men that it should be possible to devise some system whereby the workers who devote both time and energy so willingly to the good of the cause shall receive credit for the work done and whereby better educational and social advantages would be afforded them in this great movement. It is quite evident that such a system must be founded on a just and equitable basis and the details worked out along efficiency lines in order to achieve success and avoid the affair becoming a dead issue. The opinions of a great many men of experience in this line of work must be brought together and carefully considered before an efficient system can be devised that will adequately provide for a work that has become nation-wide in its scope. Permit me, therefore, to make the following suggestion in regard to an organization, or rather reorganization of our work. It is as follows:

Need of Reorganization in First-Aid Work by Forming a National Society

Let the mining branch of the National Safety Council, together with the Federal Bureau of Mines, call a meeting of all persons interested in first-aid work in mines, for the purpose of considering the advisability of organizing a National First-Aid Society, as a section of the mining branch of the National Safety Council. If thought best, a committee could then be appointed to devise and draft a constitution and bylaws for presentation and adoption by the society thus formed.

The object would be to bring first aid, accident and disease prevention and social betterment in the mining districts of the United States under one head. I would suggest that a system might well be adopted whereby first-aid societies of different mines and mining towns and camps can be chartered to act as locals of the national society. A standard method of teaching first-aid work could be adopted and a system devised whereby each first-aid man would receive credit for the work he performs. Such a system would enable the national society to keep in touch with and properly direct the work done by each local society.

I make this suggestion in the belief that the time has fully arrived when first-aid work must be either organized and readjusted or its possible growth and accomplishments will become dwarfed. I sincerely hope that the subject will be discussed thoroughly by all readers of *Coal Age* who are interested in the great first-aid movement.

John L. Boardman,
In Charge of Mine Rescue and First Aid,
Butte, Mont. Anaconda Copper Mining Co.

Efficiency vs. Financial Success

Letter No. 2—Referring to the article "Efficiency vs. Making Money," *Coal Age,* Feb. 26, p. 366, it would appear that while the writer disclaims favoring in any way the running of mines on a "loose-jointed, haphazard basis," he is inclined to attribute many of the failures in mining to present-day efficiency and improved methods of operation.

While I frankly admit that, in this day of doing great things and looking for great results to follow and in our haste to adopt new appliances and new methods in the operation of coal mines, there is grave danger of swinging to the other extreme in respect of mining equipment and methods when the results obtained are not proportionate to the outlay, but considering efficiency in its true sense and meaning as applied to the operation of a mine, I cannot agree altogether with the writer's view.

Mining Conditions Largely Determine Success

As I understand it, "efficiency" means the best way of doing things. It is nothing more than the use of good common-sense in the operation of a coal mine, taking into consideration the nature of the seam worked and the surrounding conditions. In other words, it studies the best methods to employ in operating a mine under certain conditions. As natural conditions have to be reckoned with, and as these differ widely in mines, they must always determine the best plan of operation relative to the cost sheet and the comfort, health and safety of employees. The methods used in operating mines forty years ago may have proved successful and remunerative under conditions that existed at that time, but in this day of close competition and overproduction the same methods applied under similar mining conditions would result in failure.

While some mines today are operated at a profit, others are worked at a loss. In some instances this could not be avoided with the most efficient management and the best possible equipment, because of the physical conditions encountered. For example, assume a 5-ft. seam of coal, clean and regular in formation, with a good roof and the drainage such that little if any water need be handled. Suppose that, owing to its quality, the coal brings the highest market price, is always in demand and the railroad facilities are good and can be depended on to furnish cars at all times. Also, the natural surroundings are all that can be desired for an ideal mining camp and the educational, moral and social standards maintained are excellent, so that there is always an abundance of the best class of miners on hand. We will say, further, that this mine has an efficient management and the best equipment and that modern methods of mining are employed. The plant, of course, makes money and we are too often ready to conclude that the manager is a "money maker" without considering the nature of the mine.

Now, let the same "efficient" management, with the same modern equipment, try to get like results from another seam of coal, say only 3½ ft. in thickness, irregular in formation and so wet that many pumps are required to keep the water down. Let the coal be dirty and of an inferior quality so that it does not sell well in the market. Suppose, also, the roof is bad and trouble-

some so that a considerable percentage of the coal is lost; the railroad facilities poor and uncertain; the camp isolated and without educational advantages and the moral and social surroundings bad so that there is always a scarcity of good men to operate the mine. Then, compare the cost sheet and profits earned in this case with those of the former mine, and the conclusion is inevitable that mine failures are not always to be attributed to inefficient management or success in mining to the efficiency of the management, as these results are largely due to natural conditions and insurmountable disadvantages.

My experience and observation have been that in most cases a "makeshift" in a coal mine generally proves expensive in the end. I believe in the old saying, "A thing that is worth doing at all is worth doing well." In my opinion makeshifts in the operation of coal mines are responsible for many disasters. Improvements in the operation of coal mines, made for the comfort and safety of the men employed, as well as for the purpose of increasing the output of coal and lowering the cost of production, are good investments. It occurs to me that we have a splendid illustration of this fact in the persistent and successful efforts of the United States Coal and Coke Co. to reduce and prevent accidents in their mines, as shown in the article entitled "Interesting Fatality Figures," *Coal Age,* Feb. 26, p. 380.

Failure Follows Neglect of Future Development

In the operation of a coal mine it is all right for the manager to keep one eye on the cost sheet; but the other eye should be kept on the development and maintaining of the mine in a normally producing condition. I have known more than one instance where the manager's whole attention was directed, for a time, to obtain an increased output of coal at a lower cost. In doing this, the development of the mine was neglected to such an extent that when the successor took charge (and there is sure to be a successor to such a manager in the day of reckoning) it required a large expenditure of money to regain normal producing conditions. It is not, therefore, always the man who can produce for a time the greatest output of coal at the lowest cost who in the end will prove the safest and most profitable manager.

It is all right for coal operators to make money, as otherwise it will only be a question of time when they will be forced to suspend operations. But the operator whose chief aim is to make what money he can out of his mine today, and who manifests no thought or makes no provision for the comfort and safety of his employees, is not an ideal operator and in the end is not always a money maker. Surely the miner from whose labor the operator derives his profits deserves better social surroundings and better houses than the hovels in which many of them must often live. It is not expected that operators will build palatial residences for their men, but a wise management knows well that better homes and more pleasant surroundings have a strong tendency to make better men and invite the spirit of coöperation. On the other hand, a neglected mining camp is no economy and no indication that the operating company is making money, but is sure to breed discontent and carelessness among the employees whose lot it is to live there. In my opinion, the truly successful manager is the man who keeps up the moral and social standards of the camp where his men must dwell and gives this equal thought and attention with the keeping down of the cost sheet.

John Rose.

Dayton, Tenn.

Detecting Gas by Smell

Letter No. 7—Referring to the inquiry in regard to detecting marsh gas by smell, *Coal Age,* May 6, p. 815, I have many times had the same experience as there described in the mines of Illinois and Indiana. Since then I have studied the question a good deal, knowing that all chemists teach that methane or marsh gas has no smell. Many a time, however, I have known there was gas in my place before trying to find it with my safety lamp. For this reason I have always had the opinion that it was possible to smell the gas, although theory teaches differently.

A few years ago, before the certificate law was passed in Illinois, it happened that a new man started to work a place adjoining that of an old Welsh miner, who had the habit of looking at the new man's place when he first came in in the morning. The new man was careful to observe that his place was not marked out by the fireboss, before he would go to work, but he depended much on the old Welshman to tell him if the place was safe.

One morning when passing up the entry on my way to run out some gas that was found at the face, I met the new man, who asked where he could find the boss, as the Welshman had told him there was gas in his place, though it was not marked out. Believing that the Welshman was playing a practical joke on the new man, I told him he would find the boss on the bottom and thought no more of it, until I was called on the phone and ordered to report, myself, at the bottom at once.

On reaching the bottom, I was censured severely for treating the man's complaint so lightly and told to go at once with the man and examine his place carefully. The result was that I was surprised to find a considerable amount of gas there, which the Welshman had detected by smell. Since that time I have applied the same test myself in numerous instances. In some cases my head would become heavy after working for a few minutes only in places containing much gas. I cannot describe the smell, but am unable to rid myself of the idea that this gas has an odor whereby it can be detected without the use of a lamp.

I was much interested in reading Letter No. 2, May 27, p. 938, which gives a very interesting account of the condition of mines in France, in respect to gas, and I may say the same conditions are found in many mines in this country, although there is not generally so much gas present. I have frequently heard old firebosses claim that they knew gas was present in a place before making a test with a lamp. I have heard them describe the gas as having a "suffocating effect," but cannot say that I have experienced the same feeling, although I have become quite dizzy at times when obliged to work in the gas.

It is claimed by some that they can smell the gas better in wet places than in dry ones, while others claim the direct reverse of this and say that it can be smelt quicker where the places are dry and dusty. As I have never given this point an actual test, I cannot say whether gas would be smelt sooner in a dry or in a wet place. The discussion is an interesting one.

Cleaton, Ky. Ostel Bullock.

Inquiries of General Interest

Relation of Wheelbase to Radius of Curve

Will you kindly answer the question, What should be the relation of the wheelbase of a car to the radius of the curve in a mine track, in order to reduce to a minimum the tendency of the car wheels to climb the rails, causing the car to jump the track? For instance, assuming a mine car has a wheelbase of 28 in., what is the minimum radius of track curve that can be used with safety? Also kindly state what is a suitable radius to employ for a track curve in a mine, keeping in mind the extra expense of driving a long curve. Can you refer me to data relating to various wheelbases employed on track curves of different radii? E. R. DUNSFORD.

St. Anns, N. S., Can.

Assuming this inquiry refers to a rigid four-wheeled truck such as is commonly used on mine cars and illustrated in the accompanying diagram, it may be stated that when such a truck strikes a curve in the track, the flange of the forward outside wheel *A* grinds along the gage line of the outer rail, by reason of which the truck *ABCD* is continually shifted to a more or less radial position on the curve. It has been found by many experiments with small models that the rear axle of the truck, marked *CD* in the figure, assumes a radial position provided the gage of the track is widened sufficiently to permit it to do so. But if the gage is not widened sufficiently, the curvature of the track forces the rear axle out of the radial position, causing the rear inner wheel *C* to chafe that rail. The natural or ideal position of the truck on the curve is shown at *ABCD* in the figure.

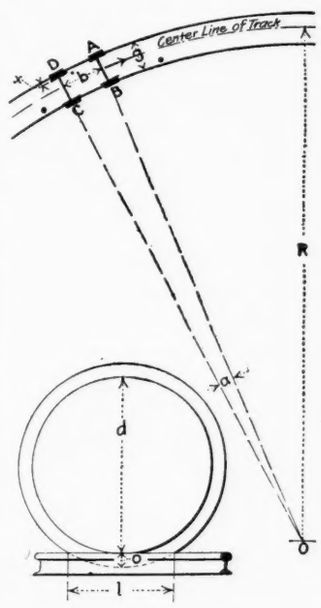


DIAGRAM SHOWING TRUCK ON CURVE

It is readily seen that any effort of the forward outer wheel *A* to force the rear axle *CD* from its radial position, by reason of the track gage not being sufficiently widened, increases the tendency of the wheel *A* to climb the rail. The ideal condition is realized when the track gage is so widened that the rear axle *CD* of the truck coincides with the radius of the curve when the flange of the wheel *A* is in contact with the gage line of the outer rail.

In the lower part of the accompanying figure is shown a car wheel having a diameter *d* and resting on a section of rail, the flange of the wheel having a width *o*, as indicated in the figure. It is necessary to explain here that in the plan given only that portion of each wheel is shown that extends below the tread of the rail, corresponding to the length of the chord *l* in the lower diagram.

When estimating the necessary increase in gage of track for sharp curves, in order to realize the ideal condition to which we have referred, it is necessary to calculate the half-length of the chord *l* by the formula

$$\tfrac{1}{2}l = \sqrt{o(d+o)}$$

The flanges of mine-car wheels are usually 1⅛ in. deep, making the value of the half-chord for an 18-in. wheel

$$\tfrac{1}{2}l = \sqrt{1\tfrac{1}{8}(18+1\tfrac{1}{8})} = 4.6\ in.$$

For sharp curves this half chord must be added to the wheelbase *b* and their sum divided by the radius of the curve, all being expressed in inches, which gives the sine of the angle *BOC* included between the radii drawn to the centers of the two respective axes of the truck. Then multiply the versed sine of this angle (1 — cos) by the radius of the curve expressed in inches, and the product will be the amount *x* that it is necessary to increase the track gage in order to realize the ideal condition.

For example, assuming 18-in. wheels and a 28-in. wheelbase, the radius of the curve being, say 50 ft., we find the sine of the angle included between the two radii

$$Sin\ BOC = \frac{28+4.6}{50\times 12} = 0.05433$$

The corresponding cosine of this angle is 0.99852 and its versed sine 1 — 0.99852 = 0.00148. Multiplying this by the radius of the curve expressed in inches gives for the distance *x* that the gage must be increased,

$$x = 50\times 12\times 0.00148 = 0.888,\ say\ \tfrac{7}{8}\ in.$$

Care must always be taken that the tread of the car wheels is sufficiently wide to span the rails when the gage is increased this amount.

The driving of a long curve, though expensive, will often save much trouble and decrease the cost of operation to an extent that will far outweigh the first cost. In general it may be stated that the minimum radius of curve increases with the track gage and speed of hauling. Where it is possible to adopt a 50-ft. radius when hauling at a speed of, say 6 mi. per hr., with a 2½- or 3-ft. gage, in mule or light-motor haulage, a minimum radius of 60 or even 75 ft. should be adopted for hauling at a speed of 8 or 10 mi. per hr. over a 3½- or 4-ft. gage. In special cases, particularly with mule haulage and a narrow gage, the minimum radius may be reduced to 40 ft. without incurring serious trouble. When employing either rope haulage or large locomotives capable of hauling long trips and necessitating heavy iron, it is not advisable to adopt a radius less than 100 ft., except for short distances.

An excellent article on "Underground Mine Roads" will be found in *Coal Age*, June 3, p. 959, and June 10, p. 1000, writen by J. McCrystle, a mining engineer of experience in that class of work.

Examination Questions

Pennsylvania Anthracite Mine Foremen's Examination, Shamokin, June 6, 7, 1916

(*Selected Questions*)

Ques.—What are the conditions that should be taken into consideration in determining the width of breast and pillars? Should they be of equal width under all circumstances?

Ans.—The width of breast is determined chiefly by the character of the roof, floor and coal, thickness and inclination of the seam, and the depth of cover, together with the length of time the breast must remain open before the work of drawing back the pillars is commenced. The width of pillars is determined with respect to the width of opening, nature of the roof, floor and coal, depth of cover and the length of time the pillars must stand before being drawn.

The width of opening and width of pillar are not necessarily equal. Under a frail roof the rooms must often be driven narrow, with wide pillars between them. The same is also true when the bottom is soft and liable to heave. On the other hand, with hard roof and floor and a moderate roof pressure it is often possible to drive wide rooms with comparatively narrow pillars, especially if the coal is hard.

Ques.—If the map shows a distance of 200 ft. between the gangway and the landline parallel to the gangway, how far can a breast be driven without crossing the line, where the pitch is 48 deg.?

Ans.—The distance shown on the map is the horizontal distance from the gangway to the landline. The corresponding distance measured on the pitch of the seam is 200 ÷ cos 48 deg. = 200 ÷ 0.669 = say 299 ft., which is the length of room that can be driven in this case, as measured on the pitch of the seam.

Ques.—What is natural ventilation, and is such method of ventilation reliable for mining purposes? State why.

Ans.—Natural ventilation is that produced by natural causes, such as the natural heat of the mine causing an air column in a shaft or slope or in dip or rise workings. Natural ventilation is often produced by the pressure of surface winds on one of the openings of the mine and, in exceptional cases, by a natural fall of water carrying the air downward into the mine when natural drainage of the water is afforded.

Natural ventilation is unreliable, because of the change constantly taking place in atmospheric conditions on which this form of ventilation depends. The temperature of the outside atmosphere may be above or below that in the mine, and owing to this fact, the natural ventilation in a mine in winter may be the reverse of that in summer. Again, the temperature of the outside air may be the same as that of the mine, when the natural ventilation from this cause will fail.

Ques.—Suppose a mine has two openings, one 60 ft. higher in elevation at the surface than the other. The temperature of the outside air being 85 deg. and that of the mine air 50 deg., will there be a current of air passing, and if so, what will be its direction in the mine?

Ans.—In actual practice much will depend on the depth of the two shafts, since the outside air is rapidly cooled on entering a deep shaft, while the temperature of a comparatively shallow downcast may be nearly that of the outside air. In answer to the question, however, it may be assumed that the difference in elevation at the surface, in this case, presents an air column of 60 ft., having a temperature of 85 deg. outside of the mine, which partly balances 60 ft. of the air in the upper part of the deeper shaft, where the temperature is 50 deg. The cooler air in this shaft being heavier than the outside air, volume for volume, then makes the deep shaft the downcast, while the other shaft becomes the upcast.

Ques.—When a fan is exhausting the air from a mine, how does it produce ventilation? State also how a forcing fan produces ventilation.

Ans.—The action of a centrifugal fan is such as to create a difference of pressure between its intake and discharge openings, whereby air is drawn in at the center of the fan and discharged at its circumference. When such a fan is exhausting air from a mine, the arrangement is such that the intake opening at the center of the fan is placed in connection with the mine, so that the mine air is drawn into the fan and discharged at its circumference through the fan chimney into the atmosphere. In this case, owing to the action of the fan, the mine pressure is below that of the atmosphere, and the atmospheric pressure acting on the downcast shaft forces the air through the mine and into the fan, from which it is discharged as just explained.

When a fan is forcing air into the mine, the arrangement is such that its intake openings are exposed to the outside atmosphere, while the discharge from the circumference of the fan is conducted by the fan drift directly into the mine. In this case, owing to the action of the fan, the mine pressure is above that of the atmosphere and forces the air through the mine to the discharge opening or upcast.

Ques.—What material in your judgment should be kept on hand at fiery or gaseous mines to meet emergencies likely to arise from explosions of firedamp?

Ans.—A complete first-aid equipment should be kept constantly on hand ready for use when needed in such a mine. This includes the usual splints and bandages, besides the more common emergency medicines, such as glycerin, vaseline, bicarbonate of soda, ammonia, camphor, witch hazel and arnica. Besides, there should be kept on hand blankets and stretchers and a full rescue equipment, including breathing apparatus, safety lamps, pulmotors, oxygen tanks, etc. The equipment should also include an ambulance. There should, moreover, be provided suitable apparatus and equipment for the extinguishing of fires that are liable to follow an explosion of firedamp in a mine.

Coal and Coke News

Washington, D. C.

A voluminous decision revising the freight rates on coal and coke from Virginia points has been rendered by the Interstate Commerce Commission. The case included a decision of the complaint of the Stonega Coke and Coal Co. against the Louisville & Nashville and other railroads. The Commission declared that commercial competition was considered a controlling factor in the adjustment of these rates. In substance the decision of the Commission was summarized as follows:

1. Reasonable divisions to the Interstate R.R. out of the through rates involved are fixed at 15c. per ton on coal and 18c. per ton on coke.

2. Where the traffic involved is only a portion of the traffic moving over the originating division, and only a small portion of the coal and coke traffic moving over the line, which, in turn, is only a small proportion of the entire coal and coke tonnage moving over the entire system, a claim that the rates on the traffic involved are confiscatory is not established until it be shown that the rates on the other traffic moving over the originating line are reasonably remunerative and that the revenue derived from the other coal and coke traffic moving over the line is adequate.

3. Reasonable rates on coal from St. Charles and Appalachia are found to be such as do not exceed the rates contemporaneously in effect from Middlesboro-Jellico to the same destinations by more than 15c. per net ton. Reasonable coke rates for the future will be such as do not exceed $2.50 per ton to Chicago with proportionately scaled rates to other destinations involved.

4. St. Charles is included in the Appalachia group and a differential from this group of 15c. per ton over Middlesboro-Jellico rates on coal is fixed.

5. The Appalachia group rate is to be applied from operations on the Interstate R.R.

A decision has been entered by the Interstate Commerce Commission condemning the proposed increased rates on bituminous coal in carloads from mines of the Southern Ry. in Illinois and Indiana to stations on the Chicago & Alton R.R. in Missouri. Generally speaking, the present rates from the Southern's Belleville district mines range from $1.30 per net ton to $1.90 per net ton. It was proposed to increase these to $1.60 and $2.15 per net ton. The Commission held that the proposed increases have not been justified and directed the roads to cancel them.

The Commission has also issued a decision condemning the proposed increased rates on coal in carloads from Raton, and other points in New Mexico, to stations on the Trinity & Brazos Valley Ry. from Cleburne, to Limestone, Texas, inclusive. The Atchison proposed to cancel the joint commodity rates and render applicable the rates in effect to and from Fort Worth, which would be from 10c. to 75c. per net ton higher than the present joint rates. Such an advance the Commission held has not been justified and the roads were directed to cancel the proposed new schedule of rates.

HARRISBURG, PENN.

The miners of Pennsylvania through the system inaugurated by the United Mine Workers of America, both in the anthracite and bituminous regions, are claimed to be getting the best results of any class of labor coming under the terms of the workmen's compensation law.

When a miner is injured, his mine committee immediately notifies the district officers, who send a board member to investigate the case, to watch its settlement and to see that the miner or his family gets full compensation to which he is entitled. If the coal company does not enter into a contract or settlement with the injured man or his family for any reason, the representative of the union finds out why. If there is cause for complaint the legal department of the organization is notified, and he files a claim petition.

When a referee is appointed, the testimony collected through the mine workers' organization is presented to support the claim of the injured man, and the thoroughness with which this has been looked after is attested by the fact that not a single case has been lost in the anthracite region.

While most of the compensation has been collected without difficulty, considerable trouble has been experienced in a number of cases.

A peculiar case was recently decided in the anthracite region, when the board sustained the referee after an appeal by the coal company. A young man, who left home when he was very small, returned a little over a year ago and since that time lived with his father, contributing to his support. The coal company contended that the father was not a dependent. It was shown before the referee, however, that the young man was engaged to be married and that he had told his intended wife that he could not be married unless his father could live with him, as he needed a home. The board decided that the father was a dependent.

Does the Agreement Supercede the Law

Whether the new agreement made by the officers of the mine workers union and the anthracite coal companies as to hours of labor and working conditions can supercede or cancel the existing mine laws was the question recently raised before the Court of Luzerne County, in connection with the hearing of charges against Lewis J. Davis, district superintendent of the Lehigh & Wilkes-Barre Coal Co., who was arrested on a bench warrant on complaint of the State Mine Inspector of the district, D. T. Davis.

The outcome will be of considerable interest to both operators and mine workers, as the 8-hr. day agreement, and the attempted enforcement of the rule to keep men in the mines for the 8-hr. period, has already resulted in dissatisfaction and strikes throughout the region.

Under the anthracite mine laws when a certain number of men appear at the foot of a slope on a 15-deg. or more pitch and 1,000 ft. or more in length, they must be furnished with a car to be conveyed to the top. The Lehigh & Wilkes-Barre Coal Co. formerly provided accommodation cars for workmen at noon and 3 o'clock. After the 8-hr. agreement was adopted the company declined to provide a car before 3:30 p.m., desiring that the workmen remain in the colliery to complete the 8 hr.

As a result of this rule the employees at Nottingham No. 15 colliery, located in Plymouth, Luzerne County, went on strike on May 29, and the colliery was idle for a number of days. Complaints were made to Mine Inspector D. T. Davis, and upon affidavits sworn to by the miners, he brought the matter to the attention of the court, who had a bench warrant issued for Superintendent Lewis J. Davis, charging violation of the mine laws.

At the hearing, two contract miners testified that they presented themselves at the foot of the slope at 3 o'clock but were informed by the foot-tender that he had orders not to furnish a car until 3:30. The foot-tender then testified that he did not provide a car because he had orders from the driver boss. The driver boss said he had orders from the mine foreman T. A. Jones, and the mine foreman said his orders came from District Superintendent Davis.

The attorneys for the coal company offered no evidence but rested their case on the 8-hr. agreement made between the mine workers and operators and said that under the agreement the workmen are obliged to remain in the mine until 3:30 o'clock.

The attorneys for the state mine inspector, argued that the agreement does not supercede the mine laws, that the laws are still in force and that it is the duty of the company to provide cars for the hoisting of workmen. It is argued that the 8-hr. agreement applies only to company men who are paid by the day or hour, and not to contract miners.

This is the first legal test of the new agreement, and the result will be awaited with interest. The proceedings are brought under a provision of the mine laws whereby the judge sits in place of a court and jury, and has the power, if satisfied of the guilt of the defendant, to impose a fine of $50, and costs for each offense.

Electricity Is Discussed

Chief James E. Roderick of the State Department of Mines, called a meeting of the bituminous mine inspectors at the Fort Pitt Hotel, Pittsburgh, on June 14, 15 and 16 to discuss the question of the use of electricity in the mines, and also the use of permissible explosives.

Electricity as a motive power and also as a method of illumination, as well as for other purposes, is becoming more popular every day, and while the fatalities from the use of electricity are few, the Department of Mines is giving close attention to the installation of electrical equipment wherever it has been adopted.

Deputy Attorney General Horace Davis, on June 14, placed the first legal construction on the act of 1915 providing for retirement on half pay of aged or infirm states employees. The Department of Mines had asked if anthracite inspectors are eligible to its benefits.

The Attorney General's Department holds that neither an anthracite mine inspector nor any State employee who is elected or commissioned for a definite term can benefit by the act.

The Federal Trade Commission met for the first time in the tri-state coal territory, on June 15, at the William Penn Hotel, Pittsburgh. Representatives from every coal mine in western Pennsylvania, eastern Ohio and West Virginia, consisting of mining engineers, operators, or owners, and representatives of the various miners' associations, gathered at the call of E. H. Turley, chairman of the commission for the purpose of obtaining information, which would benefit both operators and miners alike. This was the first step on the part of the Federal Government to standardize the system of operation of coal mines.

Among the many things considered was the condition of the coke trade, if operated in connection with the mines owned by the coke makers. Each operator was asked if his company was affiliated with or controlled by any railroad, public utility, manufacturing or other industrial concern. The same information was elicited from the coal operators. The detail of the coal market covered a wide range of discussion. Each operator was required to furnish full, detailed information on a blank submitted to him, that the Federal authorities might have information first hand.

To further promote all accepted means and methods of safety, and in order to obtain a material reduction in rates of compensation insurance, nine operating coke and mining companies in the Connellsville coke region have taken concerted action in the establishment and maintenance of a district rescue station. This will be located at a point central in the district in which the interested companies constituting the group are located. These comprise the Orient Coke Co., Tower Hill-Connellsville Coke Co., Thompson-Connellsville Coke Co., Connellsville Central Coke Co., Struthers Coal and Coke Co., Brier Hill Coke Co., Union-Connellsville Coke Co., Taylor Coal and Coke Co. and the Fayetee Coke Co.

The companies in this group produce annually about 3,200,000 tons of coal and about 2,078,000 tons of coke, and will jointly bear the expense of erecting, equipping and maintaining the station. Including the building, which is to be a frame structure, an expenditure of approximately $2,500 will be made. The rescue appliances to be installed will consist of ten sets of breathing apparatus, one high-pressure oxygen pump, five oxygen supply tanks, measuring bags, water gages, air meter for testing apparatus, pulmotors, lungmotors and other devices necessary to complete the equipment of the station.

Each of the companies in the group will train a crew in rescue work. A certain number of men will be on duty at the rescue station at all times to answer any call that may be made. These will be members of the several crews and will be relieved at stated intervals by others. While on duty at the rescue station they will receive regular wages and will be carried on the pay rolls of the companies.

Under the regulations of the State Compensation Bureau the establishment of a rescue station, according to the standard of and on plans approved by the state bureau, entitles the companies operating within a three mile radius, and sharing in its maintenance, to a reduction of 18c. per $100 of pay roll in the rates for compensation insurance.

PENNSYLVANIA

Anthracite

Wilkes-Barre—Nineteen appeals were filed on June 15, by the Delaware & Hudson Co. the Hudson Coal Co. and the Northern Coal and Iron Co. from the new valuations placed on the coal properties of the companies by the board of assessors of Luzerne County for the triennial assessment. It is charged that the new valuation is excessive and exorbitant and was illegally made.

The second conference of colliery foremen with General Manager F. M. Chase, of the Lehigh Valley Coal Co., since the signing of the new working agreement, was held at Wilkes-Barre recently to discuss application of the terms of the agreement to local conditions.

Avoca—Following frequent surface subsidences in that neighborhood, a cave hole 15 ft. in diameter appeared in South St., Avoca, a few days ago, causing a cessation of traffic until the damage had been repaired. The surface overlies the workings of the Pennsylvania Coal Co.

Pittston—Fourteen teams recently competed in the preliminary First Aid contests of the South Pittston district, Pennsylvania Coal Co., to select four to represent the district in the annual inter-company contest at Valley View Park in August. None of the teams fell below 90 per cent. in the averages made in the competition. The four high teams were No. 5 shaft, 97⅛; Hoyt shaft, 96⅛; No. 14 breaker, 95⅝; No. 7 shaft, 94. Doctors Smith, of Wyoming; Robinhood, of Forty Fort and Marvin, of Luzerne, acted as judges.

Following the custom of the company to erect flag-poles in the colliery yards from which the Stars and Stripes may be displayed on holidays, workmen at Schooley shaft of the Pennsylvania Coal Co., in Exeter Borough, conducted a flag raising there last week. Benjamin Milton, superintendent of Ewen colliery, was the principal speaker.

Mahanoy City—By an order issued by the Philadelphia & Reading Coal and Iron Co. all fire bosses in the company's collieries are released from duty on Sunday, with no reduction in pay. This work will now be attended to by the night men, who will receive an increase of $3 per month for the extra duties.

The rainfall during June thus far has been so heavy throughout the region, amounting to over 4 in., that both the Lehigh Valley Coal Co. and the Philadelphia & Reading Coal and Iron Co. have been compelled to shut down collieries on account of the pumps being unable to keep the water in the mines at a workable level.

Shenandoah—The Court of Schuylkill County recently granted permission to the trustees of the estate of Stephen Girard to sell 53 acres of land on which the town of Girard Heights, a suburb of Shenandoah is to be located. Under the will of Stephen Girard it was impossible to permanently dispose of any property, only 5 yr. leases being provided for. The order of the court disposes of this handicap.

Plymouth—A serious explosion occurred in No. 2 slope, Nottingham No. 15 colliery Lehigh & Wilkes-Barre Coal Co. on the morning of June 14, when Thomas A. Jones, general inside foreman, William Lewis, assistant foreman and Wasil Wargel, a miner were seriously burned about the head, shoulders and hands. The first-aid crew was on the scene promptly. The section where the explosion occurred was materially damaged and a repair gang was set to work by Lewis J. Davis, district inside superintendent, who was in another section of the mine at the time. The explosion did not interfere with the operation of the colliery.

Hazleton—The Lehigh Valley Coal Co. is asking for bids for driving two tunnels at its No. 5 colliery here in order to tap veins of anthracite that will be developed at once. It is also planning to run a gangway at Derringer to intersect the seams.

Bituminous

Pittsburgh—The president of district No. 5, United Mine Workers of America, on June 20 received an order from John P. White, international president, to instruct the 32,000 striking miners in the Pittsburgh district to return to work. The miners who struck when their officers entered into a wage agreement with the Pittsburgh Coal Operators' Association carried their case to the general officers of the union who took this action.

Cannonsburg—Renewed activity is noticeable in the coal industry. The Pittsburgh Coal Co. is preparing to operate mines at Westland, which have been closed for two years. The National Coal Co. is opening mines on the Montour R.R. in Cecil Township, and the Lindley Coal Co. is making an opening in North Strabane Township. The Carnegie Coal Co. has let a contract for the erection of 100 additional houses at Atlasburg where it has mines.

Charleroi—The men at the Vesta mine of the Vesta Coal Co. recently returned to work on the new scale signed by the Jones & Laughlin Co., granting them a 5 per cent. advance over last year's scale.

Connellsville—Shipments of coke from the Connellsville region recently decreased to 405,000 tons while production amounted to 408,000 tons. The active oven list was cut to 85 per cent. of the total, many of the ovens being laid off for repair. Labor was in fair supply, and about 45,000 tons of coal was marketed at prices ranging from $1.75 to $1.90 per ton at the mine.

Indiana—Steps toward the reforestation of large tracts of land owned by Cosgrove & Co., coal operators in Cambria, Somerset and Indiana counties, were taken on June 17, when

John C. Cosgrove of the mining concern took the matter up with R. P. Green, professor of the Syracuse College of Forestry. A number of white and red pine trees will be planted in the near future.

WEST VIRGINIA

Powhatan—Thieves entered the office and store of the Powhatan Coal Co. recently and robbed the safe of something over $500. Nothing else, however, was missed. Bloodhounds were placed on the trail, which led across the mountain to the railroad track near Jenkinjones, where it was lost. It was evident that the robbers had caught a train at that point.

East Gulf—The Mead-Toliver Coal Co. expects to be ready to begin shipping coal by about Aug. 1. The tipple is well under way, and the mine entry has been driven a distance of about 300 ft.; 7 ft. 10 in. of clean coal has been found. About 40 houses have already been built, and 125 more are under contract.

Omar—In spite of labor shortage the output of the Main Island Creek Coal Co. is steadily increasing. A number of additional men, however, could find work at this mine.

ALABAMA

Birmingham—Five men were seriously burned in the Coalmont mine near here, June 15, by an explosion. Nearly 200 men who were in the mine at the time of the disaster were rescued without injury.

KENTUCKY

Edgewood—The Climax Coal Co., now has a force of men at work cleaning up the drift mouth and grading for the outside tracks at the old Edgewood mine from which shipments will begin probably within two months.

Pineville—More than 1,000 miners employed in the Cary, Straight Creek, Blanch and Castor mines of the Federal Coal Co. have returned to work. Forcible detainer proceedings in the local courts resulted variously and were followed by the agreement under which work was resumed.

Owensboro—Prospects for speedy settlement of the differences between the union coal miners in District 23, in western Kentucky, and the operators are excellent, according to general opinion among both operators and men. The proposition of the operators to continue on the old wage scale, working two men in three rooms, has been indorsed by the Executive Board of the miners' union. On the strength of this approval favorable action in a referendum vote of the men which has been called is looked for.

ILLINOIS

Divernon—The Madison Coal Co.'s mine at this place, which had been closed since Apr. 1., resumed recently and 500 men, who had been idle two months, were given employment.

Springfield—The State Board of Mine Examiners has made arrangements for the annual examination for state mine inspectors, which will be held the second Tuesday in September.

Duquoin—The Burlington railroad, which is going after southern Illinois coal traffic, is making extensive improvements between Christopher and Sesser. Eight miles of double track are being laid between the two towns and the road is to be double-tracked also between Centralia and Waltonville. It is understood that the road will eventually have a double track over the entire Centralia-Herrin division. It is estimated that the company's earnings on coal tonnage originating at Herrin this year will aggregate $3,000,000.

PERSONALS

George Rhodda, of Freeland, Penn., has accepted a position as assistant mine foreman for the Lehigh Valley Coal Co. at Beaver Meadow.

A. B. Jessup, general manager of the G. B. Markle Co., has resigned to take a position as consulting engineer for a mining company in the state of Idaho.

John D. Rockefeller, Jr., recently made an inspection of the coal fields in which he is interested in eastern Kentucky, West Virginia, and along the Western Maryland R.R.

Edward Cavanagh has resigned the presidency of the E. Cavanagh Co., of Montreal, and is considering going into the coal business of Montreal in association with several other gentlemen.

E. S. Mahaffee who, for several years, has been master mechanic of the Baxter coal mines at Baxter, W. Va., has resigned his position to accept one with the Fairmont Mining Machine Co.

Louis Thompkins, a native of Pittston, Penn., who has been for several years general auditor of the Lehigh Valley Coal Co., was recently made comptroller of the company by the Board of Directors with headquarters in New York.

F. C. Haynie has been appointed engineer of mines of the Emmons Coal Mining Co., with offices in the Land Title Building, Philadelphia, Penn. Mr. Haynie was formerly connected with the Davis Coal and Coke Co. in a similar capacity.

H. W. Jenkins, Ohio sales agent for the Borderland Coal Co. was seriously injured by a natural gas explosion recently as was also his little son. The family recently moved to Columbus, Ohio, and a gas main was left open. Both Jenkins and his son are now confined in a local hospital.

Ray Quinn, who has spent practically his entire life in the coal business both in West Virginia and elsewhere, and who is now employed by Gano Moore & Co., of Philadelphia, has been assigned by his employers to Bahia, Brazil, to look after the company's export trade in South America.

M. F. Peltier, chief engineer of the Peabody Coal Co., and president of the Monarch Coal Mining Co., states that he has not resigned his positions with the above companies on account of ill health as stated in "Coal Age" of June 10. Mr. Peltier informs us that he was never in better health in his life than he is at the present time.

Edward S. Kendrick, formerly Northwestern sales manager of the Berwind Fuel Co., has formed the Kendrick Coal and Dock Co. with offices in the Chamber of Commerce Bldg., Minneapolis, Minn. This company was formed for the distribution of anthracite and bituminous coal throughout the Northwest.

OBITUARY

John C. Donnelly, formerly chief engineer of the Coöperative Coal Co. at Springfield, Ill., died recently at the age of 70 years. He had been a resident of Illinois 44 years and was a Civil War veteran.

August Beckemeyer, coal mine promoter, died a few days ago at the home of his son, H. J. C. Beckemeyer, at Carlyle, Ill. By the promotion of a mining project he transformed the hamlet of Buxton into a thriving town and the name was changed to Beckemeyer in his honor. He was 65 years old when he died.

INDUSTRIAL NEWS

Pittsburgh, Penn.—The Asbestos Protected Metal Co. announces that hereafter it will be represented in Cincinnati, Ohio, and surrounding territory, by E. G. Irwin, located in the Union Trust Building.

Youngstown, Ohio—Fires were recently started for the drying out of the last two batteries of the byproduct coke ovens at the Youngstown Sheet and Tube Co. The first two batteries have been undergoing the drying process for several weeks.

Steubenville, Ohio—The new tar plant to be used in connection with the byproduct plant of the La Belle Steel Co. is now under construction. Work at this plant was started a short time ago, and a large force of workmen is pushing it to completion.

Louisville, Ky.—With $250,000 already pledged the Louisville Industrial Foundation will begin shortly its campaign to raise a "factory fund" of $1,000,000, which it will utilize in bringing new manufacturing establishments to the city. Cheap coal is one of Louisville's strongest inducements.

Athens, Ohio—Under favorable circumstances a new Chamber of Commerce has been organized at Athens, and the sum of $5,000 a year for three years has been raised by the members. The new organization proposes to coöperate with all similar organizations in the southern part of Ohio in reviving the coal industry.

Seattle, Wash.—Washington coal in the form of briquettes will be used the coming year to the extent of approximately 5,000 tons by the United States Army in the forts along the Pacific Coast and in Alaska. The Pacific Coast Coal Co. will furnish the briquettes and it will require almost a month's operation at the briquette plant to supply this one contract.

St. Louis, Mo.—Additions to the width of the temporary municipal dock at the foot of O'Fallon street have been necessitated by the volume of freight going and coming between St. Louis and New Orleans. The dock is to be made 19 ft. 6 in. wider and a platform 90 ft. long and 20 ft. wide is to be erected at the north end of the dock. The additions will cost about $8,500.

Norfolk, Va.—The Greek steamship "Tharos," which arrived here the first part of the month, has been libelled by the Consolidation Coal Co. It is alleged that the steamer was chartered by the Consolidation company for four voyages to the Mediterranean with coal. After completing two voyages the master refused to carry any further cargoes. The amount of the libel is $200,000.

London, Eng.—With the idea of recouping at the end of the war the large losses of coal tonnage to foreign countries it is understood that various colliery and shipping interests have consolidated their capital to the extent of $500,000,000. They state the agreement is for mutual service and the interchange of commercial facilities, with the idea of making use of the power of coal and shipping for the benefit of international customers.

Cleveland, Ohio—Shipments of Lake coal have been heavy recently at the Baltimore & Ohio R.R. dock at Lorain. Three thousand cars were on hand in one day. One of the largest coal shippers on the Great Lakes states his firm is over 1,000,000 tons behind its schedule at the present time with no possible chance of ever making this up. The amount of coal to be shipped up the Lakes this season is estimated at 35,000,000 tons.

Washington, D. C.—An investigation by the Federal Trade Commission into conditions in the anthracite coal industry was ordered in a Senate resolution passed June 22. This resolution directs the commission to make a thorough inquiry into the conduct of the industry, with a view to determining the reasons for the recent advances in the price of fuel. The resolution calls for a report on the relation which wages bear to the selling price.

Springfield, Ill.—The amount of coal mined in Illinois has greatly decreased in recent years, according to an industrial survey that has just been completed. But the report says that there are still three times as many mines running as are necessary to meet the demand for fuel. One-half of the coal miners of the state, the report says, working steadily the year around, would be able to mine as much coal as has been produced annually.

Wheeling, W. Va.—Trouble in District No. 5 of western Pennsylvania has caused a change in the direction of shipments of coal from Belmont County and eastern Ohio generally. Fearing a possible suspension of work on account of dissatisfaction regarding the wage scale, large industries in western Pennsylvania have been stocking coal for the summer. Shipments from eastern Ohio due to this large demand have been going east to Pittsburgh instead of being taken west to the Lakes.

Pottsville, Penn.—Suit has been brought in the local courts by Jacob Zehner, owner of flour and lumber mills, to restrain the Lehigh Coal and Navigation Co. from draining mine water into the Schuylkill river. It is alleged that the accumulation of culm deprives him of water power at his mills. The mining company states that it would be necessary for it to cease mining if it were denied the right to drain into the river, as it claims that for every ton of coal it takes out of the mines 25 tons of water must be lifted.

Pittsburgh, Penn.—It has been developed that the H. Koppers Co. has control of the new Pittsburgh By-Products Co. The new firm will act as the holding company for the Seaboard By-Products Co. with a plant in Jersey City, N. J., and also for the Western States Coke Co. with a plant at St. Paul, Minn. Both plants will be built by the H. Koppers Co. The Seaboard company's plant will have 110 byproduct ovens and a complete benzol and chemical plant attached, while at St. Paul there will be 55 ovens with a benzol addition.

Philadelphia, Penn.—The United States Court of Appeals recently reversed a judgment of the Federal District Court of Pittsburgh, entered last September on a verdict of $403,523 in favor of J. A. Paisley, president of the Valley Camp Coal Co., of Cleveland, Ohio, covering commission on the sale of 32,000 acres of coal land in Bellaire County, Ohio, to the late Charles M. Hays, president of the Grand Trunk Ry. of Canada and the Grand Trunk Development Co. The property in question was sold by the Rail and River Coal Co. direct to the Grand Trunk Ry.

Urbana, Ill.—At the recent commencement of the University of Illinois, 222 baccalaureate degrees were granted to students of the College of Engineering. These were distributed as follows: Architecture, 27; Architectural Engineering, 26; Ceramics, 10; Ceramic Engineering, 5; Civil Engineering, 39; Electrical Engineering, 43; Mechanical Engineering, 44; Mining Engineering, 3; Municipal and Sanitary Engineering, 5; Railway Engineering, 10. In addition to the above 21 master's degrees, 21 professional degrees and 3 doctor's degrees were conferred by the departments of the College of Engineering.

New York, N. Y.—Alleging that consumers of anthracite coal will be forced to pay an increase of between $9,000,000 and $12,000,000 for their coal during the coming year. The Real Estate Board of New York and the Brooklyn Real Estate Exchange will circulate petitions among the business men of the city and vicinity, asking them to join in the movement for an investigation into the increased cost of anthracite by the Federal Trade Commission. As more than 25 per cent. of all the anthracite mined is used in New York City, the increase is of vital interest to all business men and manufacturers there.

Boston, Mass.—On June 15 the $2 per day demurrage charge for detaining freight cars on United States railroads expired by agreement and, commencing Friday, the 16th, the former charge of $1 per day was restored. The New Haven road's special charge of $5 per day, beginning with the sixth morning after cars are placed, however, will continue in effect till July 24, after which date the national demurrage charge of $1 per day will be automatically restored. It is generally understood that shippers have been approached by the New Haven with a proposition to increase demurrage charges at all its stations until the return of normal traffic conditions, which the management does not believe will occur for at least a year.

Cincinnati, Ohio—Holders of $360,000 of the $600,000 of bonds of the Marmet Coal Co. have been informed by their protective committee that suit will be entered to protect their interests, under an arrangement entered into on May 7. This action will be taken, it is stated, as a result of the failure of negotiations looking to the sale of the Marmet properties, which were to form part of a large body of properties to be acquired by a new corporation. The Union Trust Co., of Cincinnati, has been designated by the bondholders' committee as a depository for bonds whose owners desire to participate in the suit. The issue was floated in 1912, and is protected by a first mortgage on the extensive Marmet properties in West Virginia.

Wyoming, Penn.—The last of the big individual holdings of coal lands in the Wyoming Valley, that of the Pettebone estate, was recently leased to the Lehigh Valley Coal Co. on a royalty basis of 15c. a ton. This is about the maximum royalty paid in this region. The tract included 614 acres of virgin coal located in Wyoming and West Wyoming boroughs. There have been many efforts made for its purchase or lease, and it is reported that the property is valued at over $2,000,000. The property consists of five separate parcels. The Lehigh Valley Coal Co. agrees to pay $12,000 as a minimum royalty for the first year, $24,000 for the second year and $36,000 minimum royalty for the third and each succeeding year thereafter until the coal is removed.

Philadelphia, Penn.—In order to coax shy summer orders from consumers, H. C. Barr, sales manager of J. S. Wentz & Co., has had photos made during the past winter showing snow-covered mine tracks with mine locomotives stalled in the drifts, and also the shaft top as it appears when Jack Frost is acting as topman. These unfavorable conditions are matched against summer conditions showing the same scene with a setting of leafy trees and a locomotive free to go along without the hindrance of snowy tracks. The series of pictures makes a convincing argument showing why the shipper is delayed in the winter months when the cost in labor and money is much greater to produce a ton of coal than in the favorable summer weather.

Scranton, Penn.—In an effort to prevent Tony Matteucca from bringing a damage suit in the Supreme Court of the State of New York the Hillside Coal and Iron Co. has filed an action in equity and asks for a preliminary injunction to restrain the miner from proceeding with his law suit in the New York courts. The coal company sets forth that it is organized and doing business under the laws of Pennsylvania and is not registered as a foreign corporation in the State of New York. It further avers that the miner was a registered miner who suffered a broken arm on May 23, 1914, while employed in the Fernwood colliery, and that he made a settlement by accepting $100 from the company. Several similar actions have been started by local coal companies recently to restrain the bringing of suits of this nature outside the Pennsylvania courts.

Market Department

General Review

Anthracite sizes changed. Market generally well sustained. Mobilization of militia further accentuates labor shortage. Bituminous firm and exports expanding. Pittsburgh strike situation less serious. Lake trade continues to expand and Middle Western market in excellent condition.

Anthracite—The unexpected announcement of a change in the anthracite sizes is the prodominating feature. The news has not been out sufficiently long to judge the effect, though it may already be expected that the surprisingly arbitrary way in which the big companies are handling this matter will be quite justly resented in trade circles. In the meantime the current market has picked up appreciably, due, in part, to the unseasonably cool weather, and also to the fact that the opening of the fall trade is going to find the distributors with very short stocks as compared with average seasons. Strikes and labor shortages, which latter will be further accentuated by the mobilization of the militia in the mining regions, have become a serious factor, and forehanded consumers are showing a strong disposition to accumulate surpluses against a possible shortage. A weakening tendency in prices is noted in the bids made on a number of large public service and government contracts, covering both steam and domestic grades.

Bituminous—The market is rather quiet but distinctly above the seasonal average for this period of the year. The partial adjustment of the Pittsburgh district labor difficulties, with favorable indications for a general settlement, did much to relieve the tension in the Seaboard market, and have released considerable coal for that section that was being held for possible use in the West. Quite a little contract business is being closed, particularly with the railroads, though there is considerable business at down East points being held open, due to uncertainties in water transportation. The export business is increasing in a most gratifying way, present indications being that the current month will establish a new high record on this business. The recent action of the British Government in fixing maximum coal prices for shipment to France will undoubtedly result in heavier shipments to that country, making additional openings for American coal to replace the British product in neutral countries.

Lake Trade—Some Pittsburgh district mines are resuming operations and it is hoped that the current week will see the labor difficulties definitely disposed of, though there is still a marked tension over the situation. In the meantime the restricted output has had a beneficial effect on the market, which continues stronger than is ordinarily the case at this season of the year, though this is due in a measure to the large tonnages moving on contract as a result of the heavy industrial consumption. Ohio operators are crowding production to make up the deficiency in the Pittsburgh district. The remarkably unseasonable weather has also had a tendency to stimulate interest in domestic coals but the chief demand still centers around the steam grades, the call for which is heavy from the iron and steel industries. The Lake movement continues heavy, although there is still much difficulty in securing adequate vessel capacity.

Middle Western—The trade continues in excellent condition for this season of the year, with domestic business a trifle more active, if anything, and the new advance circulars firmly maintained. Most operators appear to have some business ahead, and are generally accumulating more. The industrial consumption continues at a high rate, while the railroads are absorbing a considerable tonnage on contracts and going into the spot market for additional lots. As a result of this condition, the demand continues urgent for the steam grades, and many producers are finding it exceedingly difficult to meet their requirements. The threshing demand continues to expand as the season advances. The difficulty in moving domestic lump grades remains the most serious problem in the current market, but there are definite indications of an improvement on these grades shortly.

A Year Ago—Anthracite slow in responding to low prices, and the usual summer dullness prevails. Reaction in bituminous, though heavy exports stiffen up sellers. Lake trade improves very slowly.

Business Opinions

Boston News Bureau—The more people study the fundamental conditions of the country, the more they become convinced that there is nothing in sight to cause serious apprehension. Gold continues to come in while goods continue to go out. What better could be desired? Intervention in Mexico may mean a long war, but in the end we are bound to win out, and the benefits to be derived will be vastly more than money cost. All this will be the stimulus to advance prices generally. If Europe finds that she has a competitor in the United States for munitions of war she will not endeavor to buy so closely. It will mean new contracts by Europe and we are fully prepared to supply all the wants for both home and foreign accounts.

Iron Age—The steel trade is quieter, but the quietness is not undermining prices. Only recently competitive bidding of foreign and domestic buyers was forcing prices up steadily; now the stage is reached when export demand is of more consequence than that at home. The fact that more steel in certain forms is available for early shipment is attracting attention. There is some reselling of structural steel by fabricators who bought speculatively in part. Added to this are offerings of Bessemer bars and shapes at 2.50c., Pittsburgh, for early delivery, and the marketing of considerable quantities of rejected munition steel in the form of ingots, billets and bars.

American Wool and Cotton Reporter—A world famine in wool is believed to be imminent, the question being how long the present supply at the mills can last. Some feel that the Mexican situation will tend to boom the market. Others, however, are of the opinion that the present situation has already been discounted by the fact that the Government has been giving heavy orders for some time. Business in the wool market is limited in volume, owing to high prices which merchants have had to charge. The woolen-goods market appears to be relatively strong. There has been a big sale of tropical fabrics.

Dun—In certain leading branches of business, such as in steel, textiles and leather, new domestic demands have slackened perceptibly and prices are easier. Yet this is the normal period for a lull in the lines affected, and there is now all the more reason for it because of the previous extraordinary activity. Requirements in many instances are covered far ahead and buyers are naturally disposed to proceed more slowly, while signs multiply that the element of cost is no longer a matter of secondary consideration with consumers. Commercial failures this week in the United States are 295 against 287 last week, 292 the preceding week and 380 the corresponding week last year.

Bradstreet—Trade currents, following the reaching of maximum expansion, seem to indicate a further gradual contraction, at least as regards new buying. But the situation, except in a comparatively few lines—lumber, for instance—is strongly buttressed by filled-up order books, which insure activity in industrial quarters for some time to come. Lower ocean freight rates, enlarged dividends, evidences of renewed heavy buying of steel for foreign account, and the perfecting of a $50,000,000 loan to Russia are also significant features.

Dry Goods Economist—Reports from retailers in various sections throughout the country indicate that they are doing a good business. In view of the unfavorable weather this is to be attributed principally to the general employment of labor at high wages. Some manufacturers with whom the demand but recently was most intense find a slackening, with less anxiety on the part of distributors as to deliveries. This, however, is far from being the case in the knit underwear and hosiery field, where the active domestic demand and a big increase in exports has caused production to be well taken care of for months to come.

Marshall Field & Co.—Current wholesale distribution of dry goods has been much in excess of the corresponding period of a year ago. Road sales for both immediate and fall delivery show good gains over the same week last year. Merchants have visited the market in much larger numbers than during the same period a year ago. Collections are satisfactory. The market on wool goods is strong, and prices are advancing.

ATLANTIC SEABOARD

BOSTON

Supply of Pocahontas and New River at Hampton Roads gaged closely to the demand; practically all being applied off-shore and to contracts coastwise. Georges Creek available at all points. Anthracite deliveries retarded by inclement weather.

Bituminous—The Hampton Roads shippers are getting so reconciled to the shortage of bottoms that Tidewater receipts are being held down to what can be easily moved. The export business is taking a large tonnage, the bulk of it to Italy and to South America, and the volume seems limited only by the lack of steamers. Coastwise movement is still confined to contract business, there being practically no call for spot coal. Prices are firmer, however, and there are few concessions now from the $2.85 basis. The transportation part of the business is the factor of greatest interest here and there is apprehension over the supplies for fall and winter. Those consumers who do not have season contracts for their entire supply on a delivered basis are powerless to protect themselves against whatever rates may be ruling in the fall.

Ordinarily, New England consumers who rely on Tidewater coals can turn to shipments all-rail but from the present outlook that quarter is very little, if any, more encouraging than at Tidewater. The railroads have been restricting the shipment that can go forward from any one district and there is much uneasiness over the prospect of slow movement later on. The more conservative shippers in many cases are declining orders for delivery after Oct. 1. For inland delivery there is better inquiry, many consumers having determined to take on what they can store.

Georges Creek is in ample supply and is being loaded as fast as boats arrive. A fair volume of this grade is also being loaded for export. It is expected that this grade will be available at all the piers throughout the summer months. All-rail deliveries are only fair in volume, not much advance business having been closed.

In the Pennsylvania grades there are further strengthening tendencies to be observed. Even on spot business there has been a scaling up on the part of some of the operators, 5@10c. in several instances. Practically all the varieties are in good demand, although consumers are not yet at the point where they will pay much premium for quick shipment. Certain railroad fuel contracts are still open, pending a decision whether the coal will be taken via water or all-rail. The indications are they will be closed for all-rail delivery.

Anthracite—Tidewater New England is very anxious over the slow movement of hard-coal barges. For two weeks there was not a day without rain and thick weather. Most dealers this spring have not yet received what would ordinarily be their April quota. Consumers, on the other hand, are eager to get their coal housed and retailers are kept in short supply of all the domestic sizes. While hitherto there have been plentiful supplies of all sizes at the loading piers there is now a shortage of stove or egg, this varying with different shippers. In most cases dealers are willing to accept what is to be had. There are still local labor difficulties in the anthracite region, so there is more than one reason for the rather poor assortment that reaches tidewater.

There is a general expectation here that retail prices will advance July 1. Meanwhile, Boston dealers are not accepting orders for delivery beyond this date.

Bituminous prices at wholesale per gross ton f.o.b. loading ports at points designated are about as follows:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.35@2.85	$2.[illegible]5@3.15	.....	$1.10@1.60
Cambrias and Somersets	2.60@3.00	2.90@3.30	.....	1.35@1.75
Georges Creek (contract)	3.07@3.17	3.27@3.37	$3.00@3.10	$2.00@2.10

Pocahontas and New River are $2.80@2.85, f.o.b. Norfolk and Newport News, Va., and $4.85@5 on cars at Providence and Boston.

NEW YORK

Anthracite conditions healthy and soft coal satisfactory. Spot coal scarce and prices stiff.

Anthracite—The anthracite market is in a healthy condition. Demand is good and there is little cutting of prices. Operators are finding a ready market for their output which is far from capacity owing to labor troubles and scarcity of miners which is likely to become more pronounced now that some of the Pennsylvania militia have been mobilized.

The operators are not anxious for more business under present conditions but at the same time are urging the public to lay in its winter supply. There is small prospect of storing any great quantity of coal between now and fall and as consumers failed to take advantage of the summer discounts, indications point to a brisk fall and winter trade and a possible shortage of supplies.

Egg remains the shortest with stove a close second. Demand for chestnut is not active and concessions ranging from 10c. to 25c. have been made. Pea coal is in good demand with prices firm.

The steam coals are plentiful and in good demand. Buckwheat No. 1 is being held firm at from $1.55 to $1.65 at the mines.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$4.95	.....	Pea	$3.50	$3.25@3.50
Egg	5.15	$5.10@5.15	Buck	2.75	2.65@2.85
Stove	5.40	5.30@5.40	Rice	2.25	2.20@2.25
Nut	5.45	5.20@5.45	Barley	1.75	1.65@1.75
			Boiler	2.20	

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—Conditions in the bituminous market at Tidewater are easier now that there has been a partial adjustment of the Pittsburgh labor troubles though there is comparatively little free coal in the harbor. Contract consumers are taking their full requirements and in some instances are seeking extra quantities.

Local conditions have been greatly relieved by large shipments of Pennsylvania coals to New England both by rail and water. Line business is generally good while supplies are low and dealers seem anxious to stock up before fall.

The demand for coal in the West, usually taken care of by the Pittsburgh operators, resulted in strong prices here. There is very little gas coal to be had. Slack is active and mine quotations range from $1.10 to $1.30. Some shippers continue to be restricted by embargoes.

There is a somewhat better export movement, particularly to South American ports.

Current quotations are on the following basis:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.50@3.60	$3.50@3.60	$3.50@3.60	$1.95@2.05
Georges Creek Tyson	3.10@3.25	3.10@3.25	3.10@3.25	1.60@1.80
Clearfield: Medium	2.90@3.00	2.90@3.00	.....	1.40@1.50
South Forks	3.25@3.50	.....	.....	1.70@1.95
Nanty Glo	3.10@3.20	.....	.....	1.55@1.65
Somerset County: Medium	2.90@3.00	2.90@3.00	2.90@3.00	1.45@1.55
Quemahoning	.....	3.00@3.10	3.00@3.10	1.55@1.65
West Virginia Fairmont ¾	.....	3.30@3.40	3.30@3.40	1.50@1.60
Fairmont mine-run	.....	3.30@3.40	3.30@3.40	1.50@1.60
Western Maryland	.....	2.80@2.90	2.80@2.90	1.25@1.35

PHILADELPHIA

Anthracite movement fair. Stove and egg firm but concessions on nut. Pea manipulated. Steam contracting active. Good contract trade in bituminous.

Anthracite—The trade has picked up considerably during the past week or ten days, probably due to the very unseasonable June weather. It now looks as though considerable tonnage will be moved before the end of the month, although there are still a number of dealers who are waiting for lower prices.

While circulars have been cut it has not yet been with the abandon of other years. Some confidential sales have been made with the understanding that if there was a leak and prices became known they would be withdrawn. To date the prepared sizes have held fairly firm. Small reductions on chestnut have been in evidence, such as $4.10 and $4.15 in several instances, but egg and stove continue at good prices.

Pea is weak, but even it has not been sacrificed to any wide extent. The lowest rate was probably named to dealers who bid on the board of education contract. In spite of flat denials to the contrary we know positively that quotations of $2 at the mines were made for some of this business, despite the fact that the coal must be put in on an analysis basis. None of the big companies made any effort to secure any of this contract. In the family trade blocks of pea have been sold for $2.25 and $2.30, and one shipper quoted the former price protected until Oct. 1, but this was withdrawn after a competitor had called attention to it. These figures are, of course, only given to preferred buyers.

Indications of a possible weakness in prices is seen in the bids on the Government contracts which were opened last week, a number of the prominent individual shippers bidding extremely low on both prepared and steam sizes. The retail dealers here expect soon to share the benefit of these lower figures.

The production continues restricted. Petty strikes one day last week caused the shutting down of over 20 mines, and the shortage of labor is becoming a serious menace. The big shippers without exception predict unusual business this fall and winter, and expect trouble when the big rush comes.

The steam contract business continues quite active, and is now about 65% completed. In fact one of the largest companies reported that they will not take any more business on rice or broken coal. It is stated on good authority that one of the large shipping companies closed a big contract on broken coal at 20c. less than the circular.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$3.60	$4.75	Buckwheat	$1.65	$2.55
Egg	3.85	4.95	Rice	1.00	....
Stove	4.10	5.20	Boiler	.90	1.80
Chestnut	4.20	5.25	Barley	.75	....
Pea	2.50	3.40			

Bituminous—The flurry in Fairmont coals continues and prices show further advances. All sizes are being sold at the same price, with the exception of the three-quarter gas, due to the Pittsburgh interests taking the production of many collieries on a mine-run basis.

The other grades used in this market continue at the same prices that have been ruling for a number of weeks past, with the demand still above the seasonal average. It is likely that these grades will show an increase soon, most likely before the end of July. There is quite a little contract business being closed, especially on railroad business, some of these latter contracts running for the year ending June 30, 1917. The bituminous shippers are somewhat disappointed at the lack of new tonnage they expected on account of the increased anthracite steam prices.

The prices per gross ton f.o.b. cars at mines are about as follows:

Georges Creek Big Vein	$1.90@2.00	Fairmont gas, ¾	$1.55@1.65
South Fork Miller Vein	1.70@1.80	Fairmont gas, mine-run	1.40@1.50
Clearfield (ordinary)	1.35@1.45	Fairmont gas, slack	1.40@1.50
Somerset (ordinary)	1.30@1.40	Fairmont lump, ordinary	1.40@1.50
West Va. Freeport	1.15@1.25	Fairmont mine-run	1.40@1.50
		Fairmont slack	1.40@1.50

BALTIMORE

Mobilization takes a number of men from the coal industry. The bituminous market steady but not strong, except for gas coals. The anthracite call below seasonal average.

Bituminous—The market as a whole is weak; the demand is by no means brisk, and the price list is being maintained only by the fact that production is just about meeting contract requirements. Prices for steam coals are steady, probably stiffening a little on lower grades as a whole. Because of continued demand from the Pittsburgh district, where labor troubles continue, gas coals are very tight and prices high for the comparatively little surplus fuel being produced in the region.

Prices to the trade are about as follows, at the mines, per gross ton: Georges Creek Tyson, $1.75; Miller vein, $1.55; Quemahoning, $1.60; Somerset, $1.45; Freeport, $1.20; Fairmont gas, three-quarter, $1.35; same, mine-run, $1.35; slack, $1.30.

Exports showed a good movement, a total of 16,382 tons having been loaded here for foreign ports.

Anthracite—The demand for hard coal here remains below the seasonal average. Despite the approach of July 1, when the prices will advance 20c. a ton, little purchasing enthusiasm is shown by consumers. Some dealers report trouble in getting coal through from the mines.

HAMPTON ROADS

Exports continue heavy. Coastwise movement in fair volume. Stocks light. Prices firmer.

The heavy export movement of the past 30 days continues increasing and July promises to equal, if not exceed June in this respect. Exports are principally to South America, both east and west coasts, the Mediterranean and the West Indies. The fixing of the maximum price for coal exported to France from Great Britain and the freight rates on same, will increase the consumption of British coal in France, but should benefit American exporters in neutral countries. Coastwise shipments continue large, particularly to New England.

Stocks on the terminals at Newport News, Sewalls Point and Lamberts Point are fluctuating, but comparatively light, just about meeting current requirements.

Charleston reports the export of its third cargo of coal, moving to Buenos Aires.

Prices of Pocahontas and New River mine-run are firmer, being as follows, per gross ton: $2.85@3 for cargo; $3.10@3.30 for bunkers, plus 10c. for trimming; $2.75@2.85 per net ton on track.

Local dealers announce an increase in the price of anthracite from $7.50 per gross ton to $7.50 per net ton, for summer delivery.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

Railroad	Week Ending May 20	May 27	June 3	June 10	June 17
Norfolk & Western	181,338	160,173	190,408	186,272	153,958
Chesapeake & Ohio	104,703	93,804	100,140	118,809	57,468
Virginian	95,799	79,268	67,196	81,917	39,032
Totals	381,840	323,245	357,744	386,998	250,458

Ocean Charters and Freights

VESSEL CLEARANCES

The following steamers have cleared from various ports during the past week:

NORFOLK

Vessel	Destination	Tons
Beckenham[17]	Mejillones	6,591
Breynton[6]	Buenos Aires	6,743
Coltano[10]	Buenos Aires	4,711
Angola[6]	Lisbon, Port.	6,112
Constante[16]	Genoa	4,713
Capri[6]	Genoa	4,156
Tresillian[6]	Buenos Aires	4,799
Etonian[20]	Bahia Blanca	6,607
Fortunata[16]	Bagnoli	4,229
Llanishen[16]	Civita Vecchia	5,632
Maine[6]	Ponce, P. R.	247
Iddesleigh[6]	Buenos Aires	5,735
Josephine[2]	Lisbon, Port.	1,161
Am. Transport[2]	Havana	7,691
Sorata[16]	Mollendo, Peru	5,734
Bohannon[5]	St. Michaels	849
Adriatico[16]	Genoa	6,121
Lykiardopulo[6]	Rio de Janeiro	4,702
Chipana[5]	Coronel, Chile*	1,660

NEWPORT NEWS

Vessel	Destination	Tons
Cate[7]	Buenos Aires	3,037
Rosemount[4]	Georgetown	1,970
E. S. Jones[4]	Bahia, Brazil	1,274
Ulrik Holm[4]	Havana	2,402
Kish[7]	Montevideo	6,503
M. L. Baxter[4]	Bahia, Brazil	1,482
Margarcia[4]	Sagua Grande	1,065

NEWPORT NEWS—Continued

Vessel	Destination	Tons
Crescent[4]	Santiago, Cuba	647
Neptune[4]	Port of Spain	649
Monsoldale[4]	Montevideo	3,680
I. B. Wiley[4]	Santos, Brazil	1,161
Selene[19]	Gibraltar*	5,426
Sherman[8]	Caldera, Chile	1,200

BALTIMORE

R. B. White	Nassau, N. P.	279
Rio Verge	Brazil	3,998
M. Adriatico	Spain	3,019
Tellus	Cuba	1,933
Skinfaxe	Costa Rica	1,677
M. Cantabrico	Spain	3,021

PHILADELPHIA

Lodaner	Havana	
Mary A. Hall	St. John's, N. B.	
Davenport	Buenos Aires	
Nordboon	Havana	
Westergaard	Narvik	
Geo. H. Ames	Bermuda	378
E. G. Farrar	Fort de France	850
Moldegaard	Antilla	
Thelma	Vita	
Heidretter	Fort de France	2,000

* For orders.

[1] Atwater & Co.
[2] Baker Whiteley
[3] Barber & Co.
[4] Berwind-White
[5] C. G. Blake Co.
[6] Castner, Cur. & Bul.
[7] Ches. & O. Coal A. Co.
[8] Ches. & O. C. & C. Co.
[9] Crozer-Pocahontas Co.
[10] Dexter & Carpenter
[11] Flat Top Fuel Co.
[12] Hasler Brothers
[13] Houston Coal Co.
[14] Maryland C. & C. Co.
[15] New River Coal Co.
[16] Pocahontas Fuel Co.
[17] Smokeless Fuel Co.
[18] C. H. Sprague & Son
[19] White Oak Coal Co.
[20] Northern Coal Co.

OCEAN CHARTERS

Coal freight charters have been reported as follows during the past week:

PHILADELPHIA

Vessel	Destination	Tons	Rate
Montreith	Savona		
Luiga[1]	Genoa	839	

VIRGINIA

Calumet	Las Palmas	1,092	

BALTIMORE

Vessel	Destination	Tons	Rate
Tuddal[2]	Italy	2,218	$33.60
Nea Hellas	W. C. Italy	2,267	30.00

ATLANTIC RANGE

Nea Hellas[3]	Italy	$12.00

[1] August or September. [2] July. [3] June or July.

OCEAN FREIGHTS

Freight rates to Spain are decidedly easier but to other destinations are practically unchanged. Very few steamers were chartered for export coal during the past week, and none of these fixtures have been reported.

We would quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana	$4.25	Bermuda	$4.50@5.00
Cardenas or Sagua	5.75@6.00	Vera Cruz	6.00@6.50
Cienfuegos	5.50@5.75	Tampico	6.00@6.50
Port au Spain, Trinidad	6.50 about	Rio Janeiro	[4]19.00 about
St. Lucia	6.50 about	Santos*	[1]19.75 about
St. Thomas	6.00 about	Montevideo	19.20 about
Barbados	6.50 about	BuenosAires orLa Plata	19.20 about
Kingston	5.50@6.00	Rosario	20.40 about
Curacao	[3]6.25 about	West Coast of Italy	30.60 about
Santiago	5.50@6.00	Barcelona**	24.00 about
Guantanamo	5.50@6.00	Chile (good port)	[1]14.40
Demerara		Marseilles	28.80 about

* Consignees paying dockage dues. ** Spanish dues for account of cargo.
[1] 500 tons discharge. [2] 400 tons discharge. [3] And p.c. [4] Net, 1,000 tons discharge. [5] Or other good Spanish port.
W. W. Battie & Co.'s Coal Trade Freight Report.

COASTWISE FREIGHTS

The current rate on steamers, trip by trip, Hampton Roads to Boston is $1.90, with vessels and barges at from 10@35c. higher, depending on the size cargo and the berth for discharge. Off-shore rates are so attractive that very few sailing vessels are still available for coastwise trade and even coal shippers who have steamers building are apparently more interested in finding customers for their ships than in making rates on coal to New England; 85@90c. is the rate on barges from New York to ports on Long Island Sound, with barges none too plentiful.

LAKE MARKETS

PITTSBURGH

Mining being resumed very slowly. Fair demand for prompt coal from outlying districts.

Resumption of union coal mines has proceeded very slowly since last report. While more mines are in operation they are not as a rule working full and it seems certain that less than one-half the capacity of the union mines is productive. Last week the miners held some district conventions while this week there are conferences with operators. One or two independent operators have made arrangements with their men, resulting in their returning to work, but everything is uncertain and they may not stay at work.

There has been a good trade in Westmoreland gas coal, for which as high as $2 at the mine has been secured in some instances, prices in general being somewhat lower. For ordinary steam coal West Virginia is practically making the market, at not over about $2 delivered, equal to $1.62 f.o.b. Pittsburgh district mine. The lower Connellsville operators are not offering much coal, as prices are not particularly attractive to them.

The circular price of $1.50 is of course entirely nominal. We quote prompt coal roughly as follows: Slack, $1.50@1.65; mine-run, $1.60@1.75; ¾-in., $1.70@1.85; 1¼-in., $1.80@1.95, per net ton, basis f.o.b. mine, Pittsburgh district.

BUFFALO

Shippers waiting to see if consumers will stock up. Some miners going to work. No. 8 coal coming in. Anthracite normal. Light Lake shipments.

Bituminous—The consumers still anticipate no trouble in getting adequate supplies and are not ordering any more coal. Some jobbers are shipping very little more than their contract coal and may not increase that amount any time soon. Few miners are returning to work, particularly in the Pittsburgh district, but old Pittsburgh shippers here are sure that Pittsburgh coal will soon be plentiful again. Meanwhile the sellers of Ohio coal are active and are seeking to make their trade permanent, but jobbers in the Pittsburgh trade are sure that they can reëstablish the lead as soon as coal becomes available again.

Prices are fairly strong. The fact that so much coal is going on contract has a steadying effect, but an increase of production, which is already taking place will tend to disturb prices. Following are regular quotations:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.95	$2.75	$2.80
Three-quarter	2.85	2.60	.....
Mine run	2.75	2.50	2.60
Slack	2.40	2.30	2.60

Prices are per net ton, except east of Rochester and Kingston, Ont., where they are per gross ton.

Anthracite—The trade is fairly good, though there is no prospect of making up the tonnage lost early in the season. There is a scarcity of men and the disposition to work is not as good as it ought to be. The men do not like the agreement made with the operators and every excuse is taken advantage of to lie idle.

An effort will be made to ship as much coal to the upper ports as usual, though it is not coming this way as fast as it could be handled here. Shipments by Lake for the week were a little more than formerly, being 77,350 tons, divided as follows: 21,000 tons for Duluth and Superior, 19,300 tons for Fort William, 14,550 tons for Milwaukee, 10,000 tons for Green Bay, 5,000 tons for Chicago, 3,700 tons for Sheboygan, 2,600 tons for Port Arthur and 1,200 tons for Racine.

The local demand for coal is as good as the movement westward, prices to retailers remaining as follows per gross ton:

Grate	$5.85	Chestnut	$6.35
Egg	6.10	Pea	5.00
Stove	6.10	Buckwheat	3.50

For putting on board vessels 25c. gross is added. A reduction of 30c. per ton is allowed for June delivery.

CLEVELAND

Market weaker. More mines resuming operations and consumers have stopped buying.

Local market conditions are weaker than they have been for the past three weeks. The consumers of Pittsburgh and Youghiogheny coals have stopped purchasing No. 8 and coal has become more plentiful, especially slack. A few of the independent operators' mines, and also some of the larger companies' mines, are working in the Pittsburgh field and while there is no assurance that the whole field will resume work shortly, still the consumers are holding off in hopes that all the mines will be going shortly and that they will soon be getting their full contract requirements.

Following are the market prices, f.o.b. Cleveland:

	Three-quarter	Mine Run	Slack	Lump
No. 8	$2.10	$2.00	$1.90	.....
Cambridge	2.10	2.00	1.90	.....
Middle district	2.05	1.90	1.85	.....
Hocking	.....	.....	1.80	.....
Youghiogheny	On strike	.....	.....	.....
Pittsburgh	On strike	.....	.....	.....
Pocahontas	.....	2.70	.....	$3.35
Fairmont	2.10	2.00	1.90	.....

DETROIT

Steam-coal sales disappointing to the wholesalers. Domestic business light. High rates offered on coal to Lake Michigan.

Bituminous—Wholesale dealers and jobbers complain of a lack of interest on the part of steam users. Buying lacks regularity and orders fall short of expectations. Nut, pea and slack lead in activity, with the supply available, wholly adequate. Prices range closely around 90c., f.o.b. mines. There is light demand for three-quarter lump at $1.20 to $1.25 and even less interest in mine-run at about $1.15. Attempts to interest buyers in domestic coal have little result; inquiries come in but orders are delayed. Retail dealers are making little effort to accumulate stocks. There is considerable coal on tracks, but with the exception of the larger sizes few sales are made below schedule to free cars threatened with demurrage.

Anthracite—Retail dealers are not buying anthracite very freely. A few orders are booked from other Michigan towns and a small amount of business is being done in Detroit.

Lake Trade—Offers of 60c. a ton on cargoes of coal for Milwaukee and 70c. for delivery to Racine, Wis., failed to bring much vessel tonnage to shippers in the Lake trade during the week. Except for boats owned and operated by coal shippers, few freighters are carrying coal to Lake Michigan ports. Shipments to Lake Superior docks are limited chiefly by the slow arrival of coal at loading docks, though owners of the larger Lake freighters figure they make greater profits by sending their ships up without cargo to bring down iron ore. With ore cargoes plentiful and rates profitable, vesselmen are not particularly anxious to handle coal.

COLUMBUS

Domestic demand not quite so strong. Steam and Lake business active. Tone of the market generally satisfactory.

There has been a slight falling off in domestic demand due mostly to the excessive rains which have prevented dealers from making deliveries and stopped the demand from rural sections. Dealers are not inclined to stock up under present circumstances and are playing a waiting game. On the whole the domestic trade is quiet and no great activity is expected for several weeks. Some Pocahontas is moving and this also applies to the West Virginia splints, while quite a few orders for Ohio-mined coal for July delivery are now being received.

Steam business is active and there is no let-up in orders from manufacturing establishments. Buying in the open market is fairly general. Most of the steam contracts have been closed although some are still being negotiated. There is a strong demand for the small sizes owing to activity in iron and steel circles.

Lake trade continues strong in every way. The tonnage moving from Ohio and West Virginia mines to the head of the Lakes is large. The docks are busy and no congestion is reported from the upper Lake ports. Boats appear to be more plentiful than earlier in the season.

Production in Ohio fields is gradually increasing, although some car shortage, especially in eastern Ohio, is curtailing the output. In the Hocking Valley more mines have been placed in commission. Pomeroy Bend is now engaged in shipping to the Lakes. Massillon and Tuscarawas are also fairly busy. In fact there is a general tendency to increase the output to take advantage of the troubles in Western Pennsylvania.

Retail prices remain firm all along the line. Anthracite is moving fairly well at former quotations. Hocking lump is bought only for present needs.

Prices in short tons, f.o.b. mines are as follows:

	Hocking	Pomeroy	East Ohio		Hocking	Pomeroy	East Ohio
Re-screened lump	$1.60	$1.70	.....	Egg	$1.30	$1.35	....
Inch and a quarter	1.50	1.50	$1.40	Mine-run	1.20	1.20	$1.15
Three-quarter-inch	1.40	1.40	1.30	Nut, pea and slack	.95	.95	.95
Nut	1.30	1.30	.....	Coarse slack	.85	85	.85

CINCINNATI

Improving conditions are in evidence. Lake movements good and domestic demand excellent. Cars and labor still scarce.

The railroads report a heavy volume of business at the various ports, with larger dumpings than last year, indicating that the movement to Northwestern ports is reaching something like a satisfactory volume. There is still an occasional difficulty in getting vessels, but as a rule the transportation situation is much better than it has been. As a result little or no coal has been forced for sale here, and retailers are coming into the market in increasing numbers. Many large concerns are sold up, and those with coal to sell are having very little trouble in disposing of it at very satisfactory prices.

The car situation is not good, running in the best cases only about 75% of requirements. Labor is still scarce. This condition, coupled with the natural strength of the market at this time, bids fair to make for good business for an indefinite period.

LOUISVILLE

Business continues good and movement up to expectations. Improvement in labor situation noted.

Improvements in the labor situation in both the eastern and western Kentucky fields constitute the important developments in the Kentucky market for the week. More than 1,000 miners in the Straight Creek field have resumed work. In western Kentucky the miners are considering a proposal of the employers, which has every prospect of being approved. Prices are without change. Shipments continue about on the normal basis. Very little river coal is coming down.

COKE

CONNELLSVILLE

Prompt coke market easy. Contract negotiations find buyers and sellers apart. Production and shipments considerably decreased.

The spot furnace coke market has continued to show the easy tone it developed early last week, small lots being usually available at $2.40, while $2.50 seems to be a top price, and operators asking higher prices seem simply to be out of the market. The current demand is light.

Negotiations are proceeding apace on second-half furnace coke contracts, but there is considerable divergence between buyer and seller, the usual asking price being $2.75, while prospective buyers are talking about $2.50. It develops that two contracts recently closed, already mentioned, and aggregating about 25,000 tons a month, were about as close to $2.50 as to $2.75, although a high grade of coke was involved.

Foundry coke is in decidedly poor demand, the prompt market being quiet while there are hardly any negotiations on contracts. Operators are holding rather stiffly to former quotations, as the scarcity of labor makes them less anxious to sell foundry coke as compared with furnace. We quote: Spot furnace, $2.40@2.50; contract furnace, $2.50@2.75; spot foundry, $3.25@3.50; contract foundry, $3.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended June 10 at 405,804 tons, a decrease of 26,068 tons, and shipments at 408,383 tons, a decrease of 22,852 tons.

Buffalo—The market grows a little stronger week by week, but the movement is not heavy and shippers are not satisfied. A return to selling the coal direct is hardly advised, as there is danger of overloading that market. Prices remain on the basis of $5.25 for best Connellsville foundry.

Chicago—Domestic coke sizes tend to increased activity, with spot prices ranging between $4.95 and $5.20. Metallurgical coke is absorbed as fast as shipments reach this district. Prices per net ton, f.o.b. cars Chicago, are as follows: Connellsville, $6@6.25; Wise County, $6@6.25; byproduct foundry, $6@6.25; byproduct domestic, $4.95@5.20; gas house, $4.50@4.60.

St. Louis—Foundry coke is in stiff demand and considerable business is being booked for future delivery. The Mississipi Valley furnace will start up this month and this will substantially increase the tonnage moving into St. Louis. Domestic coke is selling freely, but shipments are not as yet going forward to any extent. Egg is very well sold up though the supply of chestnut and stove is still plentiful.

MIDDLE WESTERN

GENERAL REVIEW

Prices well maintained. Slightly improved domestic demand. Steam coals brisk and prices steady. Moderate trading in smokeless and anthracite.

The market is in a healthy condition, with domestic demand slightly accelerated this week. Western operators do not expect heavy domestic buying until early in July. The demand from country dealers remains quiet owing to the inclement rainy weather, making the country roads impassable, but it is expected that there will soon be a demand on interior retailers from the harvesting trade. Retail demand in the cities is even lighter than usual at this time of the year, and most yards are well stocked. Advanced June prices are firmly upheld, and assurances given that they will go higher rather than lower.

Small sizes of steam coal continue the most active, and some operators are experiencing difficulty in providing enough screenings to cover contract requirements and open orders. While fine coal is a trifle easier, averaging from 90c. to $1, increased contracting for steam coals has tended to strengthen the spot market for coarse steam sizes.

The smokeless trade holds its recent improvement, and little consignment coal is appearing in this market. Some shippers report an improvement in the anthracite demand, while others state that trading is inactive. Accumulated domestic sizes at the mines have been reduced, but operators are still disposed to hold coal at points of production, rather than to send it to markets which cannot absorb it.

Warm weather in the Northwest has had a tendency to reduce shipments to that section, although the Pittsburgh labor situation has strengthened Illinois prices in that direction. Vigorous efforts are being made by Illinois producers to supplant the Eastern tonnage and they are leaving nothing undone to profit by the distress of the Eastern coal companies. Movement of soft coal via the Lakes is also restricted, owing to lack of bottoms.

CHICAGO

Buying of domestic sizes improved. Fine coal slightly easier. Prices steady. Southern Illinois districts are operating about half capacity.

Since the higher June prices on southern Illinois production went into effect domestic business at Chicago has fallen off somewhat, but considerable shipments are booked for the latter part of this month, so the outlook is favorable. Some domestic tonnage is being shipped from the Williamson County mines to the country, and steam coal is moving in large volume.

Big consumers in the Northwest seem disposed to switch from Eastern coals and energetic efforts are being made to secure some of this business. Current prices are firm at circular, with screenings strong at around 95c. to $1 per ton. Steam lump has been moving in large quantities from Saline County mines and southern Illinois mines are operating at about 50% capacity.

Springfield screenings are slightly easier in the Chicago market, but in strong demand at St. Louis and adjoining territory. Mines are operating about one-half time. Coarse steam coals have been shipped in fair quantities to the Chicago district. Domestic coal shows but little improvement.

The production in the Peoria district as compared with a year ago is showing a gratifying increase. Domestic shipments are light, but steam and railroad demands are causing a number of mines to work full time.

May output of Indiana mines fell short of the production of the same month last year, because consumers were using coal placed in storage prior to Apr. 1. These storage piles are now about exhausted, and as a result demand is improving and prices are stiffening.

The spot smokeless market is featureless. While the circular price of lump and egg is $1.90, some spot coal has sold around $1.60. Mine-run is averaging around $1.25.

Hocking is quiet, domestic lump bringing the circular price of $1.60, and but little splint coal has moved into Chicago as yet.

The main activities in Kentucky coal are confined to steam sizes, which are bringing fair prices.

Anthracite is moving fairly well. Some retailers have placed orders to take advantage of the June price. Consumers have not yet entered into the market, and seem disposed to delay storage. Better buying is expected toward the close of the month.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars mines:

	Williamson and Franklin Co.	Springfield	Carterville	Clinton	Knox and Greene Cos.
Lump	$1.45@1.55	$1.35@1.50	$1.40@1.55	$1.40@1.50	$1.50
Steam lump	....	1.25@1.30	....	1.30@1.35	1.30@1.35
2½ and 3-in. lump	....	1.20@1.25	....	....	....
1½-in. lump	....	....	....	....	....
Egg	1.45@1.55	1.25	1.40@1.50	1.40@1.50	1.40@1.50
Nut	1.45@1.55	1.25	....	1.35@1.40	1.35
No. 1 washed	1.50@1.60	....	1.50@1.60	....	....
No. 2 washed	1.45@1.50	....	.95@1.00	....	....
No. 1 nut	1.45@1.55	....	....	....	....
No. 2 nut	1.45	....	....	....	....
Mine-run	1.25	1.10@1.15	....	1.15@1.25	1.15
Screenings	.95@1.00	.90@ .95	....	.95@1.00	1.00@1.05

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va. Smok'l.	Penna. Smokeless	Hocking
Lump	$1.45@1.55	$1.40@1.85	$1.65@1.90	$1.50@1.75	$1.65@1.75
1½-in. lump	1.40@1.50	1.25@1.35	....	....	1.40@1.50
Egg	1.45@1.55	1.25@1.60	1.60@1.90	1.45@1.70	1.60@1.70
Nut	1.35@1.45	....	1.45	1.35@1.50	....
No. 1 nut	1.45@1.55	....	....	....	....
No. 2 nut	1.40@1.45	....	....	....	....
Mine-run	1.25	1.15@1.25	1.20@1.25	1.15@1.25	1.25
Screenings	.90@ .95	.85@.95	..	....	....

ST. LOUIS

General improvement with slight price advances. Thrashing demand opens up in the south.

Standard coal is considerably stiffer and there seems to be a much heavier demand for steam use. Railroads are buying quite freely in the open market and steam plants are also taking a heavy tonnage. Screenings and fine coal of all kinds are very scarce. Most of the operators have some future business and are accumulating more, which is a healthy sign.

Williamson county operators are beginning to feel a much better demand from dealers and the thrashing trade in the South. There is also some little demand springing up in the west and north for domestic coal. The steam demand is exceedingly heavy on the small sizes.

Franklin County operators are running fairly well, something better than half time. They are carying a good deal of lump coal at the mines but the movement is improving and dealers are beginning to buy. The schedule of prices is being rigidly maintained.

Anthracite has slowed down, though a considerable volume of orders are coming in. The chances are that there will not be much of a lull during June and July, as is usual on anthracite.

The market is quotable on the following basis per net ton, f.o.b. mines:

	Franklin County	Williamson	Staunton and Montgomery	Intermediate	Standard
6-in. lump	$1.55	$1.45	$1.25	$1.25	$1.00
6x3-in egg	1.55	1.45	1.25	1.25	1.00
3x2-in. nut	1.55	1.45	1.25	1.25	1.00
No. 2 nut	1.45	1.20	1.10	1.10	.95
No. 3 nut	1.40	1.10	.....	.....	...
No. 4 nut	1.30	....	.....	.....	...
No. 5 nut	.75	....	.....	.....	.....
Screenings	1.00	.90	.90	.90	.85
2-in. lump	.....	.....	1.15	1.10	.85
Steam egg	.....	.....	1.15	1.10	.85
Mine-run	1.25	1.10	1.10	1.05	.85
Washed	.....	.....	.....	.....	.....
No. 1 nut	.....	1.55	1.45	1.40	1.40
No. 2 nut	.....	1.40	1.40	1.30	1.30
No. 3 nut	.....	1.35	1.30	1.25	1.25
No. 4 pea	.....	1.20	1.20	1.20	1.20
No. 5 slack	.....	.70	.75	.70	.70

KANSAS CITY

Prices on steam coal in Kansas City and vicinity are tending higher, owing to the strike in the Kansas field, storms last week that curtailed operations at 80 per cent. of the mines in the district, and the possibility of a general strike July 31. The supplies of slack from Kansas are little more than sufficient for contracts, the surplus going at about 10c. higher than last week. There is enough slack on hand and in sight for immediate needs, but consumers are providing against contingencies by storing. The demand for the Arkansas coal is also being stimulated by the campaign against smoke, an ordinance having been introduced recently covering this question.

PRODUCTION AND TRANSPORTATION STATISTICS

EXPORTS

Exports of domestic coal and coke from the United States, and bunker coal laden on vessels engaged in the foreign trade, at the specified districts, during the month of April, 1916, were as follows:

Districts	Anthracite	Bituminous	Coke
Maine and New Hampshire	23	.....	.....
Vermont	472	1,285	68
St. Lawrence	76,768	102,264	2,540
Rochester	17,662	43,267	1,186
Buffalo	95,340	153,195	41,745
New York	19,257	2,225	1,677
Philadelphia	2,571	54,736	.....
Maryland	991	88,320	4,504
Virginia	.....	416,712	1,992
South Carolina	.....	2,263	.....
Florida	.....	1,909	30
Mobile	.....	400	.....
New Orleans	.....	781	18
Sabine	.....	.....	8
Laredo	.....	4,620	.....
El Paso	69	6,666	.....
Eagle Pass	.....	353	459
Arizona	.....	4,373	15,208
Southern California	6	17	.....
San Francisco	.....	.....	1,398
Washington	67	90	2,327
Alaska	.....	1	.....
Dakota	267	2,592	375
Duluth & Superior	19	3,372	230
Michigan	81	100,956	9,883
Ohio	.....	338,210	8,422
Total	213,593	1,328,607	92,070

BUNKER COAL

	Gross Tons
Maryland	37,371
New York	259,944
Philadelphia	40,676
Virginia	128,748

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during May and the preceding three months in short tons:

	February	March	April	May
Pocahontas Field	1,434,153	1,506,671	1,442,497	1,540,624
Tug River District	333,102	338,232	343,854	374,396
Thacker District	254,953	276,308	258,659	286,491
Kenova District	83,218	88,440	74,993	86,662
Clinch Valley District	124,626	137,641	122,155	127,861
Other N. & W. Territory	3,616	5,724	2,963	3,770
Total N. & W. Fields	2,233,668	2,353,016	2,245,121	2,419,804
Williamson & Pond Creek	100,985	104,846	97,547	110,319
Tug River & Ky. R.R.	50,925	54,254	50,125	56,311
All other railroads	168,798	205,391	459,279	507,774
Grand total	2,554,376	2,717,507	2,852,072	3,094,208

MIDDLE WESTERN ROADS

The following is a comparative statement of coal handled over the 17 principal Middle Western carriers for the months of February, and the first two months of 1915 and 1916:

	February		Two Months	
	1915	1916	1915	1916
Illinois Central R.R.	592,875	1,094,080	1,409,224	2,141,496
C. & E. I. R.R.	499,986	903,188	1,240,653	1,819,728
C. B. & Q. R.R.	421,527	759,868	1,130,282	1,540,716
C. C. C. & St. L. R.R.	423,891	637,083	958,278	1,263,121
Vandalia R.R.	401,306	554,628	926,223	1,142,643
C. T. H. & S. E. Ry.	256,020	419,870	595,300	810,781
C. & A. Ry.	147,888	325,689	360,411	634,908
Wabash R.R.	138,198	208,564	317,710	425,904
St. L. I. M. & S. Ry.	109,308	122,271	262,792	328,890
Southern Ry.	82,680	208,878	194,163	379,472
B. & O. S. W. R.R.	93,968	83,708	208,009	169,522
St. L. T. & E. R.R.	46,985	85,249	112,370	176,986
St. L. & O. F. Ry.	47,409	75,808	120,756	159,865
L. & M. Ry.	48,711	56,614	120,926	122,431
C. I. & L. Ry.	44,788	59,105	86,615	135,583
C. P. & St. L. Ry.	34,066	58,693	85,138	126,175
C. & N. W. Ry.	37,186	75,326	84,726	150,967

FOREIGN MARKETS

GREAT BRITAIN

June 8—Tonnage continues to arrive slowly and the loading pressure is not so great. Colliery outputs are somewhat heavier and most coals not reserved by the authorities are offering more readily. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$12.24@12.48
Best seconds	Nominal	Seconds	12.00@12.24
Seconds	$12.00@12.48	Best Cardiff smalls	7.20@ 7.48
Best dry coals	9.60@12.00	Cargo smalls	4.08@ 4.68

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering is very quiet and rates are approximately as follows:

Gibraltar	$8.40	Naples	$18.00	St. Vincent	$11.40
Marseilles	14.84	Alexandria	24.60	River Plate	10.20
Algiers	....	Port Said	24.00		
Genoa	18.00	Las Palmas	10.80		